anglia displays

Selection Guide

www.anglia-displays.com

| LCD Displays | Drivers | Embedded SBCs | Touch Controllers | Backlight Solutions | Keypads | Connectors

enter the world of displays

So, you're interested in displays? This book is designed to help you work out what's best for you and your project. Whether you're looking for the latest TFT displays or you need support deciding which display driving solution to use, we can guide you through the process.

Who is Anglia Displays?

Anglia Displays is a division of Anglia Components with expertise in the increasingly specialised field of display technology. You can buy everything from mono character modules or state-of-the-art TFT Touchscreens, through to Single Board Computers and Panel PCs, selecting from economical products to rugged displays for industrial applications.
We've selected a mix of suppliers that includes the Display industry's leading brands and smaller companies that have something special to offer.

HITACHI Inspire the Next · Microtips Technology · BONA · CTC
DIODES INCORPORATED · ST · intersil · MICROCHIP
avalue · SOLOMON SYSTECH · HRS · TAICOM · AVX

Our main contact details are as follows :

Tel: +44 (0)1945 47 46 45 **Email:** info@anglia-displays.com
Address: Sandall Road, Wisbech, Cambs PE13 2PS U.K.

For the very latest information on our entire range of LCDs and accessories, please visit our website : **www.anglia-displays.com**

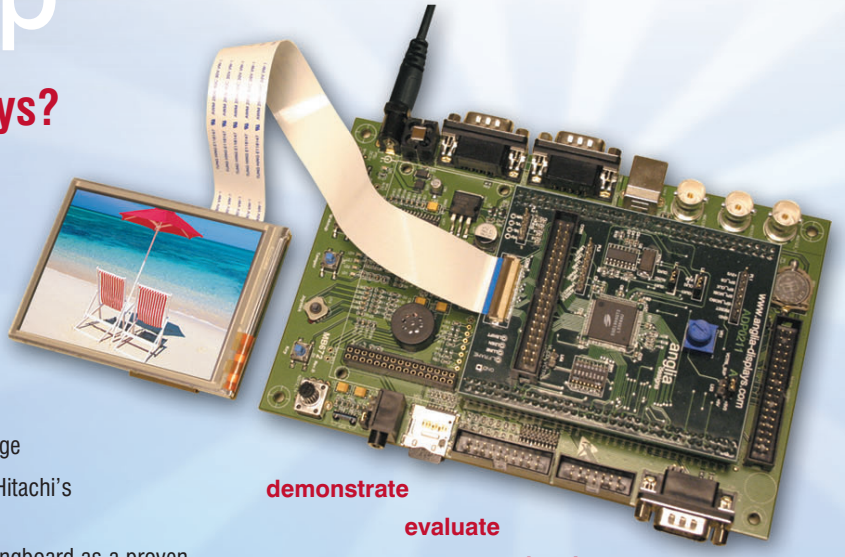
anglia displays

supporting you

step by step

Need a 'Springboard' into displays?

Working closely with our sister company Anglia Designs, we have designed and produced a highly flexible suite of low cost hardware and software reference platforms, which we call 'Springboards'. Designed for driving and interfacing to Hitachi's TFT displays, these can be used to rapidly reduce your 'concept-to-production' cycle in many ways :



- To demonstrate your ideas at the concept/product definition stage
- To directly compare and evaluate the optical characteristics of Hitachi's displays against others
- Shrink hardware development time drastically by using our Springboard as a proven hardware platform upon which to develop your software
- Shrink software development time drastically by using our proven software libraries
- Avoid costly PCB layout and re-spin issues by basing your hardware around our reference circuitry

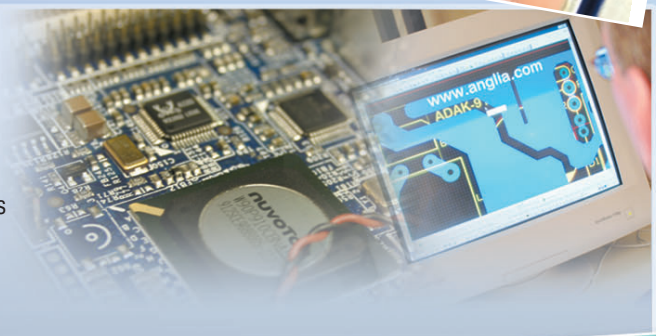
We have 'Springboard' solutions available to drive all popular sizes and resolutions of Hitachi TFT screens. These are based around three different, widely-adopted MCU cores, giving you a choice between Microchip's PIC24F or PIC32 families, or STMicroelectronics STM32 ARM® Cortex™-M3 families. Our springboards have been developed to accelerate your design process; they are also an ideal 'Technology Prover' for those new to TFT based designs.

Which display will work best for you?

Unsure on what display will work for you? Then book an LCD demonstration with one of our qualified engineers. This gives you the option to see the displays working to help you make the right decision and discuss further support through to the final stages of production.

anglia designs

Anglia Designs is an associate company of Anglia Displays, providing in-depth design support. Based in a newly opened technology centre, Anglia Designs has comprehensive facilities that includes fully equipped labs and an EMC test chamber. The extensive capabilities of our qualified engineers and software designers we can take you through the design process step-by-step.



Your partner in Technology

Springboards help you jump into TFT technology with confidence

For more information on our 'Springboard' range, to discuss working with Anglia Designs or book a demonstration, phone us now on **+44 (0)1945 47 46 45** or email **info@anglia-displays.com**

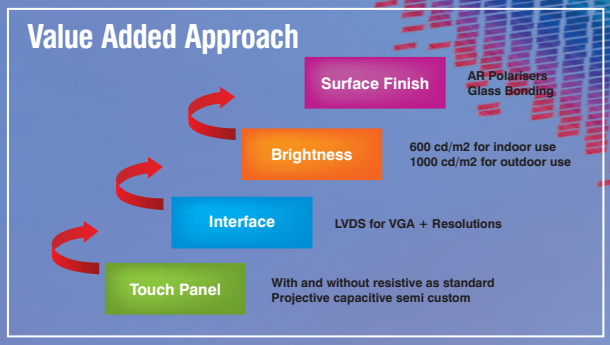
Choosing the best

We have selected the best suppliers in the 'display' industry to give you maximum choice. Hitachi are a market leader when it comes to display technology developing first their own In-Plane Switching (IPS) and now IPS-Pro as well as super-slim devices, anti-glare and anti-scratch screens, plus much more. In addition to IPS, Hitachi use their proprietary cutting edge IPS-Pro Technology to give true best-in-class viewing angles and optical performance with high brightness and long life LED backlight options. You can find all these products in this book and on our website **www.anglia-displays.com**

Why Hitachi?

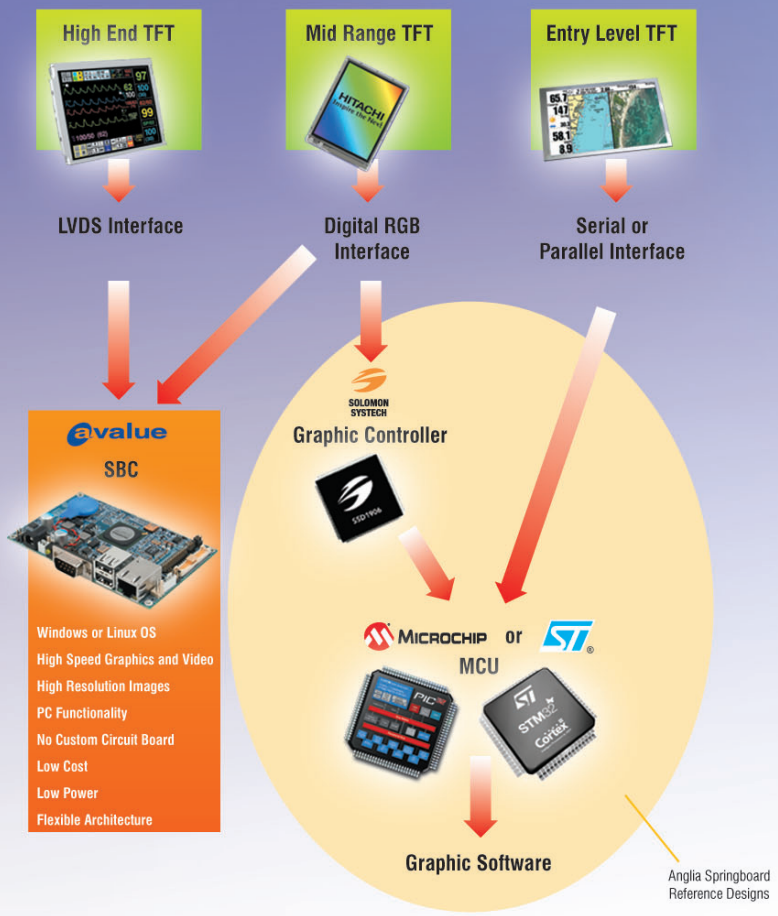
- Specifically designed for the needs of the industrial user
- Engineered for robustness and reliability
- 30 month warranty
- Minimum five year product life before obsolescence

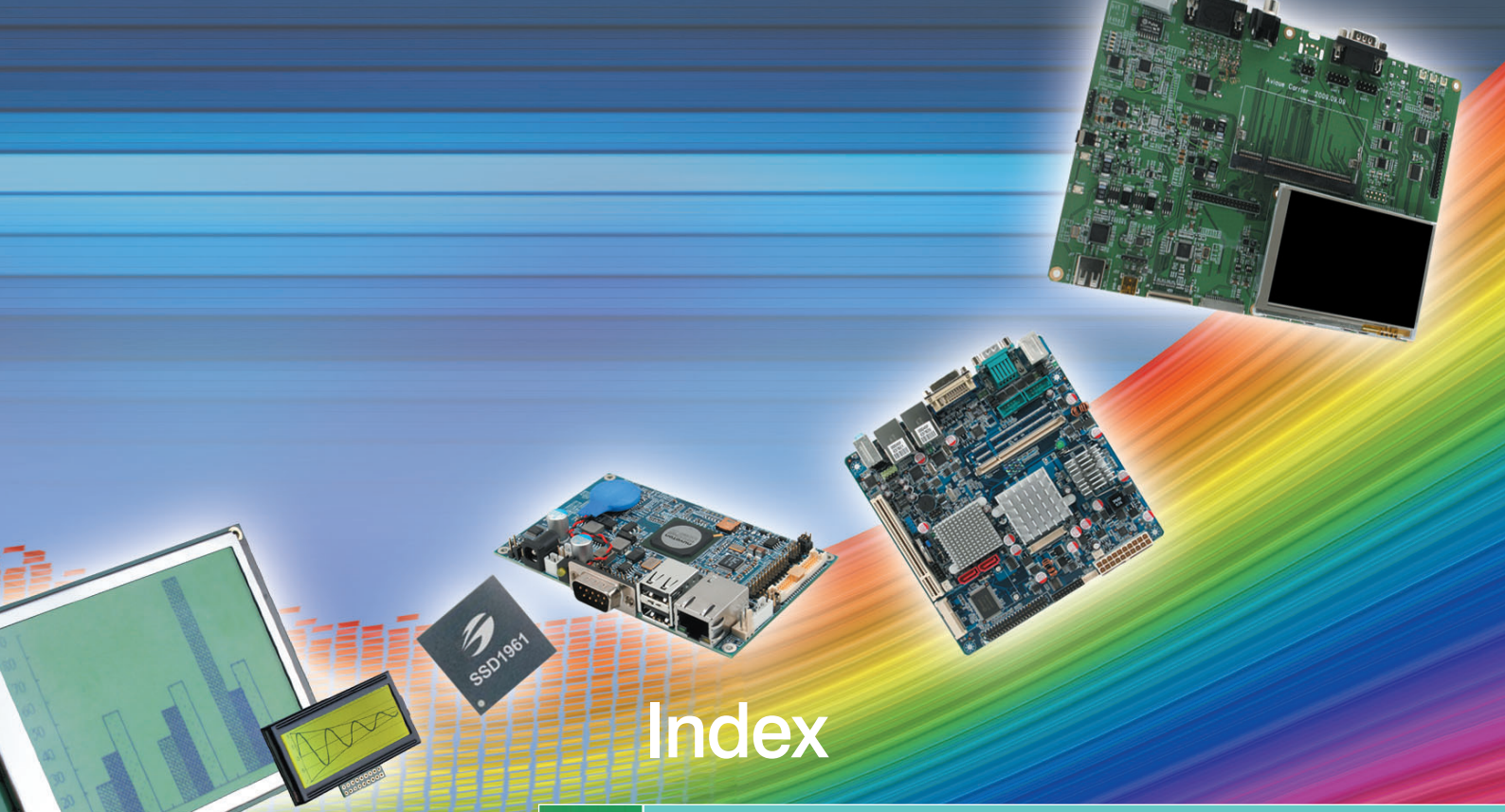
Value Added Approach



Choosing the right TFT driver solution

The flowchart below is designed to help you choose the right display driver for your TFT needs.





Index

TFT Displays	Page 2 - 5
Graphic Displays	Page 6 - 9
Character Displays	Page 10 - 11
Custom Displays	Page 12 - 13
Display Driver ICs	Page 14 - 19
Embedded SBCs	Page 20 - 23
Industrial Motherboards	Page 24 - 25
Embedded Systems/Panel PCs	Page 26 - 30
Accessory Cards	Page 31 - 35
Touch Controllers	Page 36 - 38
Backlight Drivers/Inverters	Page 39 - 41
Membrane/Rubber Keypads	Page 42
Cable & Connectors	Page 43

HITACHI
Inspire the Next

2.7” to 21.3” Screen Sizes

Features

- **Excellent Optical Performance**
  Advanced LCD drivers and Hitachi’s black matrix colour filters provide high contrast, reduced shadowing and excellent colour saturation.
- **Wide Screen Formats Available**
  Various display sizes are available in wide screen 16:9 formats WVGA and WXGA.
- **Wide Viewing Angle Types**
  In-Plane Switching (IPS) technology offers wide viewing angle types of up to 176°.
- **Touchscreen Versions**
  4-wire analogue resistive touchscreens with anti-glare and non-scratch finish.
- **Backlight Variants**
  White LED or High Bright, Super High Bright and long life CCFL backlights.
- **Single Power Source**
  Integrated DC/DC converter enables use of a single 3.3V or 3.0V power supply for the majority of the displays.
- **Low Power Consumption**
  The combination of low voltage LC materials and Hitachi’s advanced LCD drivers featuring High Frequency Amplitude Selection (HIFAS) results in significantly reduced power consumption.
- **Compact Dimensions**
  Drawing on Hitachi’s experience as a leading supplier of Notebook PC displays, all modules are extremely compact.

Introduction

An extensive range of Colour TFT modules from Hitachi designed specifically to display active graphics by delivering excellent optical performance. Comprising of screen sizes from 2.7” to 21.3”, the range provides numerous options extending from wide screen WVGA and WXGA versions through to wide viewing angle, high bright and analogue touchscreen types. With their low power consumption and compact dimensions they will suit many varied market environments and applications.

Specification

Optical

All models are transmissive mode. Backgrounds are white unless otherwise stated.
An anti-glare finish is provided on all screen sizes of 7” and above.

Mechanical

Touchscreen adds 0.9 to 1.7mm to dimension ‘D’.

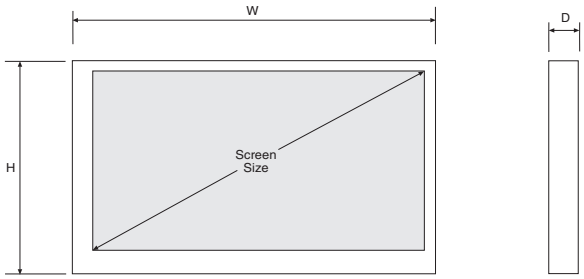
Environmental

Whilst most models are suitable for use over the -20 to +70°C industrial temperature range several versions are listed that operate over a wider temperature range.

NEW
2.4”& 4.3” Displays Available in 2010
visit www.anglia-displays.com or
call us on +44 (0)1945 47 46 45
for more information on the latest products

- Excellent Optical Performance
- Wide Screen Formats Available
- Wide Viewing Angle Types
- Touchscreen Versions
- Backlight Variants
- Single Power Source
- Low Power Consumption
- Compact Dimensions

Module Dimensions (mm)



Screen Size (inch)	Pixels W x H	Resolution	Module Dimensions W x H x D (mm)	Backlight	Brightness (Non Touch Version)	Contrast Ratio	Supply Voltage	Temp Range (°C)	Input	DC-DC Conv	Timing Control	Background Normally	Features	Part Number	Touchscreen Version	Inverter (see page 39)
2.7	240 x 320	QVGA (P)	50.54 x 68.62 x 2.6	White LED	420 cd/m2	300:1	3.0V	-20 to +70	6bit/colour		✔	White	High Bright	TX07D09VM1CBB	TX07D09VM1CAB	Not required
3.5	240 x 320	QVGA (P)	64.0 x 86.0 x 4.2	White LED	400 cd/m2	300:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX09D70VM1CBA	TX09D70VM1CEA	Not required
3.5	240 x 320	QVGA (P)	64.0 x 86.0 x 7.17	White LED	400 cd/m2	300:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX09D70VM1CDA	TX09D70VM1CCA	Not required
3.5	320 x 240	QVGA	86.0 x 64.0 x 4.2	White LED	430 cd/m2	300:1	3.0V	-20 to +70	6bit/colour			White	High Bright	TX09D40VM3CBA	TX09D40VM3CAA	Not required
5.0	640 x 480	VGA	119.4 x 89.1 x 8.8	White LED	600 cd/m2	500:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Super HB, LED Driver	TX13D03VM1CAA	TX13D03VM1CPA	Not required
5.7	320 x 240	QVGA	167.0 x 109.0 x 9.2	White LED	400 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔		White		TX14D11VM1CBD	TX14D11VM1CPD	Not required
5.7	320 x 240	QVGA	167.0 x 109.0 x 9.2	CCFL x 1	600 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Super High Bright	TX14D11VM1CBB	TX14D11VM1CAB	INVC617/657
5.7	320 x 240	QVGA	167.0 x 109.0 x 9.2	CCFL x 1	350 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White		TX14D11VM1CBA	TX14D11VM1CAA	INVC617/657
5.7	640 x 480	VGA	131.0 x 102.0 x 10.9	CCFL x 1	350 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White		TX14D14VM1BAA	TX14D14VM1BBA	INVC829
5.7	640 x 480	VGA	131.0 x 102.0 x 13.20	White LED	350 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White		TX14D14VM1BAB	TX14D14VM1BPB	Not required
5.7	640 x 480	VGA	131.0 x 102.0 x 10.9	White LED	350 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔		White		TX14D17VM1BAB	TX14D17VM1BPB	Not required
5.7	320 x 240	QVGA	131.0 x 102.0 x 10.9	CCFL x 1	350 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White		TX14D12VM1CBA	TX14D12VM1CAA	INVC829 (695)
5.7	320 x 240	QVGA	131.0 x 102.0 x 10.9	CCFL x 1	600 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Super High Bright	TX14D12VM1CBB	TX14D12VM1CAB	INVC829 (695)
5.7	320 x 240	QVGA	131.0 x 102.0 x 10.9	White LED	350 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White		TX14D12VM1CBC	TX14D12VM1CPC	Not required
5.7	320 x 240	QVGA	131.0 x 102.0 x 10.9	White LED	400 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔		White		TX14D16VM1CBC	TX14D16VM1CPC	Not required
5.7	320 x 240	QVGA	131.0 x 102.2 x 7.1	White LED	400 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔		White	Super Slim	TX14D22VM1BAA	TX14D22VM1BPA	Not required
6.2	640 x 240	HVGA	173.0 x 70.0 x 7.0	CCFL x 1	350 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX16D11VM2CBA	TX16D11VM2CAA	INVC659
6.2	640 x 240	HVGA	173.0 x 70.0 x 7.0	White LED	350 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX16D11VM2CAC	TX16D11VM2CQC	Not required
6.2	800 x 300	HSVGA	173.0 x 70.0 x 7.0	White LED	350 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Fine Dot Pitch	TX16D18VM2CAB	TX16D18VM2CQB	Not required
6.5	640 x 480	VGA	153.0 x 118.0 x 9.1	White LED	600 cd/m2	600:1	3.3V	-20 to +70	6bit/colour	✔		White	LED Driver	TX17D01VM2CAA	TX17D01VM2CPA	Not required
7.0	800 x 480	WVGA	165.0 x 106.0 x 10.5	CCFL x 1	600 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Super High Bright	TX18D16VM1CAB	TX18D16VM1CBB	INVC617/657
7.0	800 x 480	WVGA	165.0 x 106.0 x 10.5	CCFL x 1	350 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX18D16VM1CAA	TX18D16VM1CBA	INVC617/657
7.0	800 x 480	WVGA	165.0 x 104.0 x 8.8	White LED	450 cd/m2	600:1	3.3V	-30 to +85	6bit/colour	✔		Black	IPS-Pro, LED Driver	TX18D35VM0AAA	TX18D35VM0APA	Not required
7.0	800 x 480	WVGA	167.8 x 108.6 x 15.6	CCFL x 1	600 cd/m2	450:1	3.3V	-30 to +80	6bit/colour	✔	✔	White	Super High Bright	TX18D57VM2BAA	N/A	INVC789
8.0	800 x 480	WVGA	189.0 x 120.0 x 10.5	CCFL x 1	350 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX20D16VM2BAA	TX20D16VM2BBA	INVC617/657
8.0	800 x 480	WVGA	192.0 x 123.5 x 10.7	CCFL x 1	600 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Super High Bright	TX20D17VM2BAA	TX20D17VM2BBA	Not available
8.0	800 x 480	WVGA	189.0 x 120.0 x 7.5	White LED	350 cd/m2	200:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX20D19VM2BAA	TX20D19VM2BPA	Not required
8.0	800 x 480	WVGA	190.0 x 120.0 x 12.8	White LED	600 cd/m2	600:1	3.3V	-30 to +80	6bit/colour	✔	✔	Black	IPS-Pro	TX20D26VM0AAA	TX20D26VM0APA	Not required
9.0	800 x 480	WVGA	236.0 x 135.0 x 12.5	CCFL x 1	300 cd/m2	400:1	3.3V	-10 to +55	6bit/colour	✔	✔	Black	IPS	TX23D12VM0CAA	TX23D12VM0CBA	INVC814
9.0	800 x 480	WVGA	218.0 x 135.0 x 12.65	White LED	450 cd/m2	800:1	3.3V	-20 to +70	LVDS	✔	✔	Black	IPS-Pro, LED Driver	TX23D38VM0CAA	TX23D38VM0CPA	Not required
9.0	800 x 480	WVGA	216.5 x 135 x 14.5	CCFL x 1	450 cd/m2	350:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX23D55VM2BAA	TX23D55VM2BPA	INVC814
10.2	800 x 256	HSVGA	260.0 x 96.2 x 10.55	CCFL x 1	350 cd/m2	500:1	3.3V	0 to +70	6bit/colour	✔	✔	White		TX26D89VM2BAA	N/A	Not available
10.4	640 x 480	VGA	243.0 x 181.6 x 12.5	CCFL x 2	350 cd/m2	500:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	High Bright	TX26D55VM1CAA	N/A	INVC655
10.4	800 x 600	SVGA	243.0 x 185.1 x 11.0	White LED	450 cd/m2	800:1	3.3V	-20 to +70	LVDS	✔	✔	Black	LED Driver, IPS-Pro	TX26D12VM0AAA	TX26D12VM0PAA	Not required
12.0	800 x 480	WVGA	312.35 x 185.8 x 13	CCFL x 2	300 cd/m2	500:1	3.3V	-20 to +70	8bit/colour	✔	✔	Black	IPS-Pro	TX31D58VM0CAA	N/A	INVC783
12.1	800 x 600	SVGA	280.0 x 210.0 x 13.0	CCFL x 2	400 cd/m2	500:1	3.3V	-20 to +70	LVDS	✔	✔	White	High Bright	TX31D56VM2AAA	N/A	INVC783
15.0	1024 x 768	XGA	330.0 x 260.0 x 17.0	CCFL x 4	350 cd/m2	500:1	3.3V	-20 to +70	LVDS	✔	✔	White	High Bright	TX38D55VM1AAA	N/A	INVC784
15.4	1280 x 800	16:10	356.8 x 238.0 x 15.0	CCFL x 4	450 cd/m2	500:1	3.3V	-20 to +70	LVDS	✔	✔	White	High Bright	TX39D55VM1BAA	N/A	INVC784
17.0	1280 x 768	WXGA	400.0 x 258 x 22.0	CCFL x 4	350 cd/m2	800:1	5V	-10 to +70	LVDS	✔	✔	Black	IPS-Pro	TX43D55VM0BAA	N/A	INVC784
17.0	1280 x 1024	SXGA	368.0 x 306 x 19.8	CCFL x 4	270 cd/m2	1000:1	5V	0 to +50	2 Ch LVDS	✔	✔	Black	IPS-Pro	TX43D57VC0CAA	N/A	INVC813
21.3	1600 x 1200	UXGA	460.6 x 362 x 25	CCFL x 6	300 cd/m2	900:1	12V	0 to +50	2 Ch LVDS	✔	✔	Black	IPS-Pro	TX54D13VC0CAA	N/A	Not available

(P) = Portrait

Most popular displays are highlighted in orange colour

Microtips Technology

2.8” to 7.0” Screen Sizes

Features

- **Excellent Optical Performance**
  All models have anti glare finish for excellent sunlight readability.
- **Wide Screen Formats Available**
  Various display sizes are available in wide screen WVGA formats.
- **Wide Viewing Angle Types**
  Several models offer wide viewing angle.
- **Touchscreen Versions**
  All models are available with 4-wire analogue resistive touchscreens with anti-glare and non-scratch finish.
- **LED Backlights**
  All models have White LED backlights.
- **Single Power Source**
  Integrated DC/DC converter enables use of a single 3.3V or 2.8V power supply for the majority of the displays.

Introduction

The Microtips range of colour TFT displays are available in screen sizes ranging from 2.8” to 7” with a choice of resolutions from QVGA to WVGA. All models are available with the option of an analogue touch screen and feature an anti-glare coating for improved sunlight readability as standard. Versions with wide viewing angle are also available. LED backlighting is incorporated throughout the range, reducing power consumption, making the displays ideally suited to portable and industrial instrumentation applications.

Specification

Optical

All models are transmissive mode. Backgrounds are white unless otherwise stated.
All models have an anti-glare finish for sunlight readability.

Mechanical

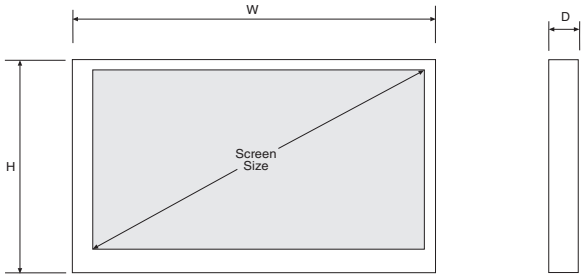
Touchscreen adds 0.9 to 2.0mm to dimension ‘D’.

Environmental

While most models are suitable for use over the -20 to +70°C industrial temperature range two versions operate over a wider temperature range of -30 to +85°C.

Tel: +44 (0)1945 47 46 45
Email: info@anglia-displays.com
www.anglia-displays.com

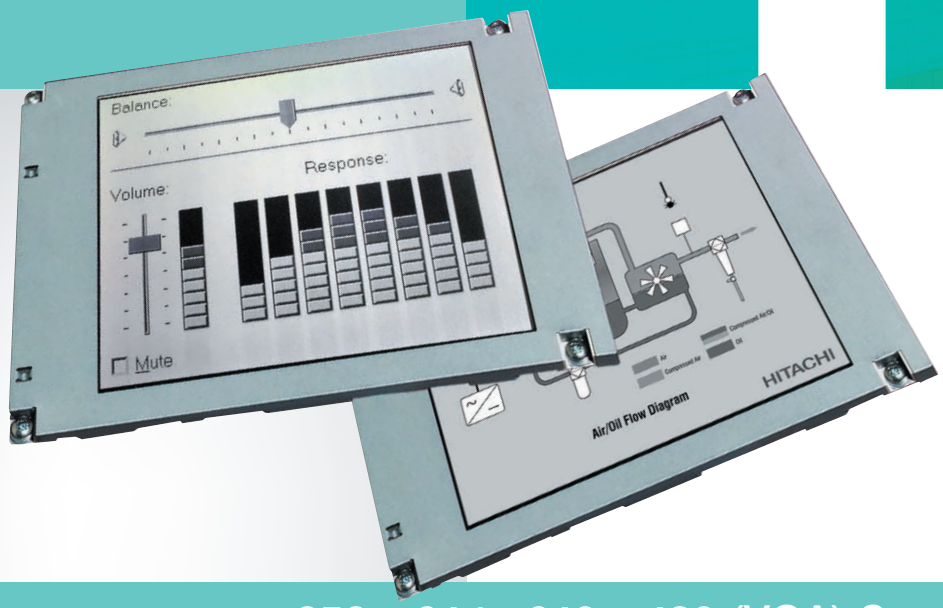
Module Dimensions (mm)



- Excellent Optical Performance
- Wide Screen Formats Available
- Wide Viewing Angle Types
- Touchscreen Versions
- LED Backlights
- Single Power Source

Screen Size (inch)	Pixels W x H	Resolution	Module Dimensions W x H x D (mm)	Backlight	Brightness (Non Touch Version)	Contrast Ratio	Supply Voltage	Temp Range (°C)	Input	DC-DC Conv	Timing Control	Background Normally	Features	Part Number	Touchscreen Version
2.8	240 x 320	QVGA (P)	50.0 x 69.2 x 2.8	White LED	250 cd/m2	300:1	2.8V	-20 to +70	8/9/16/18bit	✔	✔	White	Wide View	MTF-TQ28NN911-LB	MTF-TQ28NP911-LB
3.5	320 x 240	QVGA	77.8 x 64.5 x 3.0	White LED	250 cd/m2	300:1	3.3V	-20 to +70	8bit/colour	✔	✔	White	SPI interface	MTF-TQ35SN741-AV	MTF-TQ35SP741-AV
3.5	320 x 240	QVGA	77.8 x 64.5 x 3.0	White LED	250 cd/m2	300:1	3.3V	-20 to +70	8bit/colour	✔	✔	White	SPI interface	MTF-TQ35SN822-AV	MTF-TQ35SP822-AV
3.5	320 x 240	QVGA	77.8 x 64.5 x 3.0	White LED	250 cd/m2	300:1	3.3V	-20 to +70	8/16bit	✔	✔	White	Wide View	MTF-TQ35SN811-AV	MTF-TQ35SP811-AV
4.3	480 x 272	WQVGA	105.5 x 67.2 x 4.0	White LED	300 cd/m2	550:1	3.3V	-20 to +70	8bit/colour	✔	✔	White	–	MTF-TY43SN921-LB	MTF-TY43SP921-LB
5.7	320 x 240	QVGA	144.0 x 104.6 x 12.8	White LED	500 cd/m2	250:1	3.3V	-20 to +70	6bit/colour	✔	✔	Black	Normally Black	MTF-TQ57SN721-AV	MTF-TQ57SP721-AV
5.7	320 x 240	QVGA	144.0 x 104.6 x 12.8	White LED	500 cd/m2	250:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Wide View	MTF-TQ57SN722-AV	MTF-TQ57SP722-AV
5.7	320 x 240	QVGA	144.0 x 104.6 x 12.8	White LED	500 cd/m2	250:1	3.3V	-20 to +70	8bit	✔	✔	White	Wide View	MTF-TQ57SN811-AV	MTF-TQ57SP811-AV
5.7	640 x 480	VGA	127.0 x 98.43 x 7.0	White LED	220 cd/m2	300:1	5V	-30 to +85	6bit/colour	✔	✔	White	–	MTF-T057ACSLN-LB	MTF-T057ACSLP-LB
5.7	640 x 480	VGA	144.0 x 104.6 x 11.0	White LED	360 cd/m2	250:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	Wide View	MTF-TV57NN721-AV	MTF-TV57NP721-AV
5.7	640 x 480	VGA	144.0 x 104.6 x 11.0	White LED	550 cd/m2	250:1	3.3V	-20 to +70	6bit/colour	✔	✔	Black	Normally Black, Wide View	MTF-T057AMSLN-V4	MTF-T057AMSLP-V4
5.7	640 x 480	VGA	144.0 x 104.6 x 12.8	White LED	450 cd/m2	250:1	3.3V	-20 to +70	8/16/18bit	✔	✔	White	Wide View	MTF-TV57NN831-AV	MTF-TV57NP831-AV
7.0	800 x 480	WVGA	165.0 x 104.44 x 10.4	White LED	350 cd/m2	400:1	3.3V	-20 to +70	8/16/18bit	✔	✔	White	Wide View	MTF-TW70SN911-AV	MTF-TW70SP911-AV
7.0	800 x 480	WVGA	164.0 x 103.0 x 5.1	White LED	200 cd/m2	400:1	3.3V/-7V	0 to +60	8bit/colour		✔	White	SPI interface, Wide View	MTF-TW70SN821-LB	MTF-TW70SP821-LB
7.0	800 x 480	WVGA	165.0 x 104.44 x 9.75	White LED	350 cd/m2	400:1	3.3V	-20 to +70	6bit/colour	✔	✔	White	–	MTF-TW70SN941-AV	MTF-TW70SP941-AV
7.0	800 x 480	WVGA	163.9 x 1.3.95 x 6.4	White LED	500 cd/m2	400:1	3.3V	-30 to +85	LVDS	✔	✔	White	Automotive	MTF-TW70SN011-AV	MTF-TW70SP011-AV

(P) = Portrait



HITACHI
Inspire the Next

256 x 64 to 640 x 480 (VGA) Screen Resolutions

Features

- **Exceptional Optical Performance**
  High twist LC material and film compensated STN technology produce high contrast and excellent readability, Transflective versions for sunlight operation available.
- **Positive & Negative Mode**
  Standard parts feature both positive and negative mode versions.
- **Touchscreen Versions**
  4-wire analogue resistive touchscreens with anti-glare and non-scratch finish.
- **Backlight Variants**
  White LED, standard life or long life CCFL and Electro-Luminescent (EL) backlights.
- **Types With Built-in Controllers**
  Two screen sizes have on-board controllers.
- **Compact Dimensions**
  Tape Carrier Package (TCP) and Chip on Glass (COG) construction both produce compact mechanical dimensions and lightweight modules.

Introduction

A large range of Film-STN (FSTN) and STN monochrome graphic modules from Hitachi, offering resolutions up to VGA, complete with two colour STN modules. High bright and analogue touchscreen options together with types suitable for sunlight readability and/or harsher temperatures ensure that these products provide solutions for a broad spectrum of applications and market environments.

Specification

Optical

Option of transflective or transmissive mode. Backgrounds are white unless otherwise stated.

Mechanical

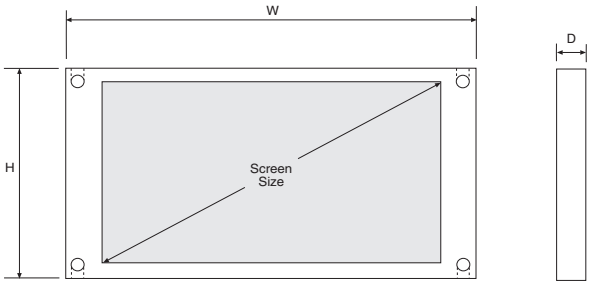
Touchscreen adds 0.9 to 1.7mm to dimension ‘D’.

Environmental

The displays listed opposite are suitable for operating over a variety of temperature ranges and include types designed for use over the wide -20 to +70°C industrial temperature range.

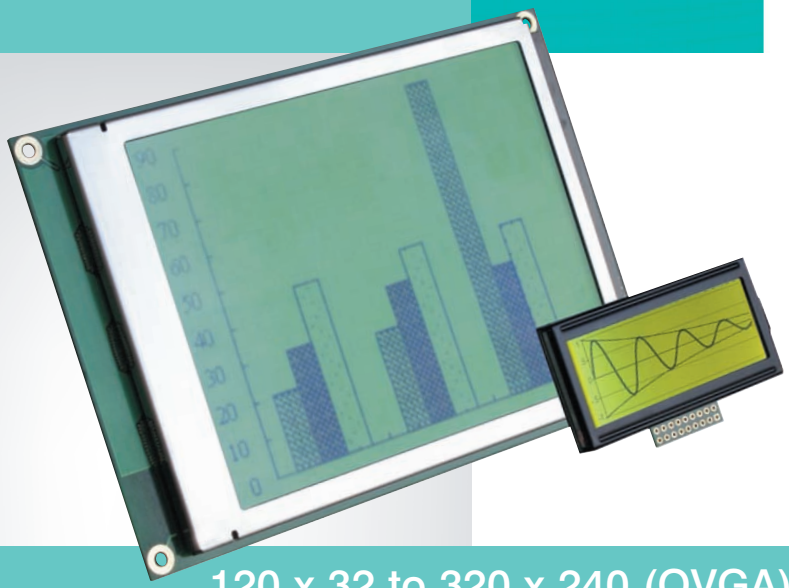
Tel: +44 (0)1945 47 46 45
Email: info@anglia-displays.com
www.anglia-displays.com

Module Dimensions (mm)



- Excellent Optical Performance
- Positive & Negative Mode
- Touchscreen Versions
- Backlight Variants
- Types With Built-in Controllers
- Compact Dimensions

Screen Size (inch)	Pixels W x H	Viewing Area/ Resolution	Display Type	Module Dimensions W x H x D (mm)	Backlight	Brightness (Non Touch Version)	Contrast Ratio	Supply Voltage (V)	Temp Range (°C)	Display Mode	On-Board Controller	Features	Part Number	Touchscreen	Inverters (see page 39)
–	256 x 64	126.3 x 37.0	BLU/GRY STN	160.0 x 68.0 x 9.5	EL	10cd/m2	3:1	5.0, -13	0 to +40	Transflective	LC7981	Negative Mode	SP12N001-T	N/A	N/A
–	256 x 64	120.3 x 30.0	BLK/W FSTN	160.0 x 68.0 x 12.0	CCFL x 1	90cd/m2	20:1	5.0, -15	0 to +60	Transmissive	T3963C	Reversible Mode	SP12N002	N/A	INVC828
–	240 x 128	120.0 x 64.0	BLK/W FSTN	159.4 x 101.0 x 11.0	CCFL x 1	150cd/m2	20:1	5.0, -15	0 to +50	Transmissive	T3963C	–	LMG7420PLFC-X	N/A	INVC828
–	240 x 128	123.0 x 68.0	BLK/W FSTN	159.4 x 101.0 x 11.0	CCFL x 1	150cd/m2	20:1	5	-10 to +60	Transmissive	T3963C	DC/DC	SP14N001	SP14N001-ZZA	INVC828
–	240 x 128	123.0 x 68.0	BLK/W FSTN	159.4 x 101.0 x 11.0	CCFL x 1	150cd/m2	20:1	5.0, -15	-10 to +60	Transmissive	T3963C	–	SP14N001-Z1	SP14N001-Z1A	INVC828
–	240 x 128	123.0 x 68.0	BLK/W FSTN	159.4 x 101.0 x 11.0	CCFL x 1	150cd/m2	20:1	5.0, -15	0 to +60	Transmissive	LC7981	Negative mode	SP14N002	N/A	INVC828
–	240 x 128	123.0 x 68.0	BLU/W STN	159.4 x 101.0 x 11.0	CCFL x 1	90cd/m2	7:1	5.0, -15	0 to +60	Transmissive	LC7981	Blue Negative Mode	SP14N003	N/A	INVC828
–	240 x 128	123.0 x 68.0	BLK/W FSTN	159.4 x 101.0 x 11.0	White LED	150cd/m2	20:1	5.0, -15	-10 to +60	Transmissive	T3963C	–	SP14N01L6ALCZ	SP14N01L6ALCA	N/A
–	240 x 128	123.0 x 68.0	BLK/W FSTN	159.4 x 101.0 x 11.0	White LED	150cd/m2	20:1	5	-10 to +60	Transmissive	T3963C	DC/DC	SP14N01L6VLCZ	SP14N01L6VLCA	N/A
3.8	320 x 240	QVGA	BLK/W FSTN	94.7 x 73.3 x 5.5	White LED	60cd/m2	5:1	3.3, 30	-20 to +70	Transflective	–	Sunlight Readable	SP10Q010-T	SP10Q010-TZA	N/A
3.8	320 x 240	QVGA	BLK/W FSTN	94.7 x 73.3 x 5.5	White LED	110cd/m2	20:1	3.3, 30	-20 to +70	Transmissive	–	Negative Mode	SP10Q010	SP10Q010-ZZA	N/A
4.7	320 x 240	QVGA	BLK/W FSTN	129.6 x 92.6 x 7.5	CCFL x 1	100cd/m2	20:1	3.0/5.0, -22	0 to +40	Transmissive	–	Negative Mode	LMG7520RPFC	N/A	INVC818
4.7	320 x 240	QVGA	BLK/W FSTN	129.6 x 92.6 x 7.5	CCFL x 1	25cd/m2	5:1	5.0, -22	0 to +40	Transflective	–	Negative Mode	LMG7525RPFF	N/A	INVC818
4.7	320 x 240	QVGA	BLK/W FSTN	129.6 x 92.6 x 7.5	White LED	60cd/m2	5:1	5.0, -22	-20 to +70	Transflective	–	Sunlight Readable	ST12Q01L6ALZZ	N/A	N/A
4.7	320 x 240	QVGA	BLK/W FSTN	129.6 x 92.6 x 7.5	White LED	60cd/m2	20:1	3.0/5.0, -22	-20 to +70	Transmissive	–	Negative Mode	SP12Q01L6ALZZ	N/A	N/A
5.7	320 x 240	QVGA	BLU/W STN	167.0 x 109.0 x 10.0	CCFL x 1	100cd/m2	6:1	3.3, -22	-20 to +70	Transmissive	–	Blue Negative Mode	SP14Q003-C1	SP14Q003-C1A	INVC132,186,196
5.7	320 x 240	QVGA	BLU/W STN	167.0 x 109.0 x 10.0	White LED	200cd/m2	6:1	3.3, -22	-20 to +70	Transmissive	–	Blue Negative Mode	SP14Q003-A	SP14Q003-AZA	N/A
5.7	320 x 240	QVGA	BLK/W FSTN	167.0 x 109.0 x 10.0	CCFL x 1	220cd/m2	25:1	3.3, -22	-20 to +70	Transmissive	–	High Bright	SP14Q005	SP14Q005-ZZA	INVC132,186,196
5.7	320 x 240	QVGA	BLK/W FSTN	167.0 x 109.0 x 10.0	White LED	150cd/m2	25:1	3.3, -22	-20 to +70	Transmissive	–	High Bright	SP14Q006	SP14Q006-ZZA	N/A
5.7	320 x 240	QVGA	BLK/W FSTN	167.0 x 109.0 x 10.0	White LED	60cd/m2	5:1	5.0, -22	-20 to +70	Transflective	–	Sunlight Readable	SP14Q006-T	SP14Q006-TZA	N/A
5.7	320 x 240	QVGA	BLK/W FSTN	131.0 x 102.0 x 10.9	White LED	220cd/m2	25.1	5.0	-20 to +70	Transmissive	–	DC/DC	SP14Q011-A1	SP14Q011-A1A	N/A
5.7	320 x 240	QVGA	BLK/W FSTN	131.0 x 102.0 x 10.9	White LED	60cd/m2	5:1	5.0	-20 to +70	Transflective	–	DC/DC	SP14Q011-T	SP14Q011-T1A	N/A
5.7	320 x 240	QVGA	BLK/W FSTN	167.0 x 109.0 x 10.0	CCFL x 1	110cd/m2	25:1	3.3, -22	0 to +60	Transmissive	–	Negative Mode	SP14Q002-A1	N/A	INVC132,186,196
5.7	320 x 240	QVGA	BLK/W FSTN	167.0 x 109.0 x 10.0	CCFL x 1	110cd/m2	25:1	3.3, -22	-20 to +70	Transmissive	–	–	SP14Q002-C1	SP14Q002-C1A	INVC132,186,196
5.7	320 x 240	QVGA	BLK/W FSTN	167.0 x 109.0 x 14.2	CCFL x 1	110cd/m2	25:1	3.3, -22	0 to +50	Transmissive	–	–	N/A	SP14Q002-C2A	INVC132,186,196
5.7	320 x 240	QVGA	Colour STN	167.0 x 109.0 x 8.9	CCFL x 1	200cd/m2	40:1	3.3	0 to +60	Transmissive	–	DC/DC, Wide Angle	SX14Q004	SX14Q004-ZZA	INVC667
5.7	320 x 240	QVGA	Colour STN	167.0 x 109.0 x 8.9	White LED	200cd/m2	40:1	3.3	0 to +70	Transmissive	–	Neg Mode, Wide Angle	SX14Q009	SX14Q009-ZZA	Not Required
9.4	640 x 480	VGA	BLK/W FSTN	257.5 x 174.0 x 7.0	CCFL x 1	110cd/m2	20:1	3.0/5.0, -22	0 to +45	Transmissive	–	Negative Mode	SP24V001	–	INVC817,823
9.4	640 x 480	VGA	BLK/W FSTN	257.5 x 174.0 x 7.0	CCFL x 1	110cd/m2	20:1	3.0/5.0, -22	0 to +45	Transmissive	–	Negative Mode	SP24V001-A	N/A	INVC817,823
10.4	640 x 480	VGA	BLK/W FSTN	264.0 x 183.0 x 9.0	CCFL x 1	100cd/m2	18:1	5.0, -22	0 to +45	Transmissive	–	Negative Mode	LMG7550XUFC	N/A	INVC818



BONA

120 x 32 to 320 x 240 (QVGA) Screen Resolutions

Features

- **Choice of Passive Matrix**

  Displays are offered in STN or FSTN.

- **Positive & Negative Mode**

  The Yellow/Green STN, Grey STN and Black/White FSTN displays listed are positive mode. The Blue STN displays are negative mode. Variations may be available upon request.

- **Viewing Direction Options**

  The normal viewing direction is 6 o'clock. Other viewing directions are available upon request.

- **Backlight Variants**

  Choice of LED, EL or CCFL backlights. LED colours are either white or yellow/green with the option of amber, blue, green or red.

- **Built-in Controller**

  An on-board controller is fitted to all models.

Introduction

A wide range of STN and FSTN monochrome graphic modules from Bona Fide and Crystal Clear Technology, which offer a choice of styles, backlighting colours and LCD colours in reflective, transflective or transmissive modes. The tables detail the most popular combinations available, with the second table listing 4:3 formats in QVGA. However, variations in their specification can be easily accommodated - please contact us to discuss your alternative requirements.

Specification

Optical

Yellow/Green STN and Black/White FSTN backlit displays are transflective mode.
Blue Negative STN backlit displays are transmissive mode.
Non-backlit displays are reflective mode.

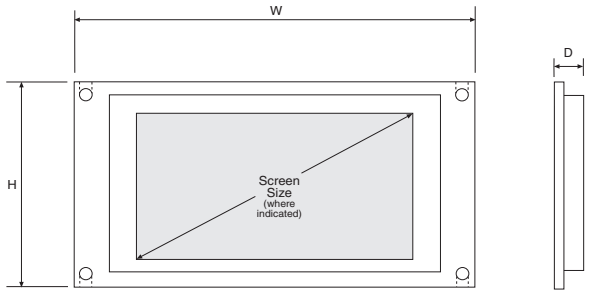
Environmental

Standard operating temperature range is 0 to +50°C.
Displays capable of handling a wider temperature range of -20 to +70°C or an extended range of -30 to +80°C can be supplied to special order.

Tel: +44 (0)1945 47 46 45
Email: info@anglia-displays.com
www.anglia-displays.com

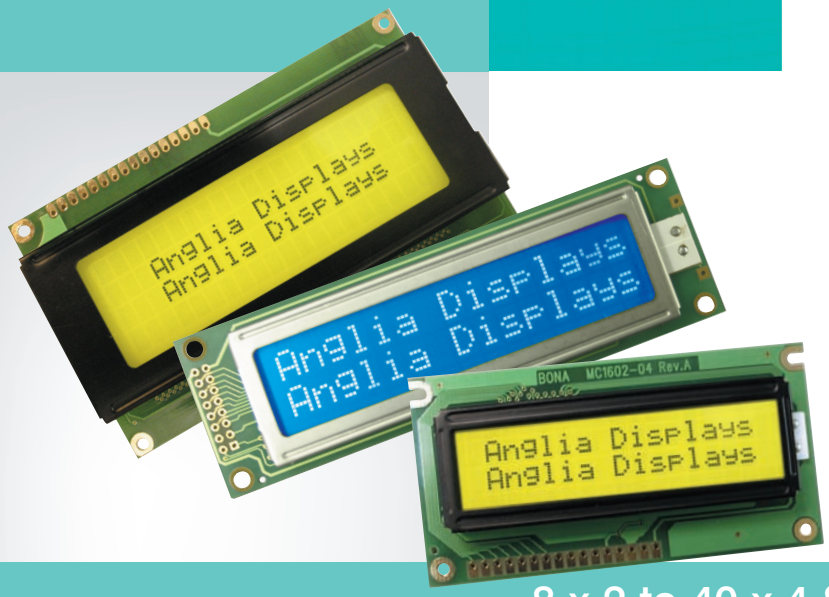
- Choice of Passive Matrix
- Positive & Negative Display Mode
- Viewing Direction Options
- Backlight Variants
- Built-in Controller

Module Dimensions (mm)



Screen Size (inch)	Pixels W x H	Viewing Area/ Resolution	Module Dimensions W x H x D (mm)	Supply Voltage (V)	On-Board Controller	Input	DC-DC Conv.	Features	Part Number		
									Yell/Grn STN + Yell LED Backlight	Blue STN + White LED Backlight	Grey STN Reflective
–	120 x 32	62.0 x 22.5	68.1 x 32.9 x 7.6	3.0, 5.4	SED1520	8bit	–	–	BY-MG12032DLYS-01	BB-MG12032DLWS-01	BG-MG12032DNS-01
–	122 x 32	61.7 x 17.4	84.0 x 44.0 x 15.0	3.0, 5.4	SED1520	8bit	–	–	BY-MG12232DLYS-01	BB-MG12232DLWS-01	BG-MG12232DNS-01
–	122 x 32	54.8 x 19.1	63.0 x 28.5 x 2.6	3.0, 5.5	SED1520	8bit	–	No B/L			BG-MG12232DNS-11
–	122 x 32	54.8 x 19.1	65.6 x 29.2 x 5.5	3.0, 5.4	SED1520	8bit	–	–	BY-MG12232DLYS-12	BB-MG12232DLWS-12	BG-MG12232DNS-12
–	128 x 64	70.7 x 38.8	93.0 x 70.0 x 14.0	5.0	KS0107B	8bit	4	–	BY-MG12864DLYS-01	BB-MG12864DLWS-01	BG-MG12864DNS-01
–	128 x 64	44.5 x 29.5	54.0 x 54.5 x 10.0	5.0	KS0107B	8bit	4	–	BY-MG12864DLYS-02	BB-MG12864DLWS-02	BG-MG12864DNS-02
–	128 x 64	31.0 x 16.5	36.7 x 29.2 x 4.55	3.0, 18	SSD1815Z	8bit or Serial	–	–	BY-MG12864DLYS-04	BB-MG12864DLWS-04	BG-MG12864DNS-04
–	128 x 64	70.4 x 38.8	93.7 x 52.4 x 5.5	3.0	SED1565	8bit	4	–	BY-MG12864DLYS-06	BB-MG12864DLWS-06	–
–	128 x 64	70.4 x 38.8	76.1 x 53.8 x 6.0	3.0, 18	STE2002 COG	8bit		–	BY-MG12864DLYS-21	BB-MG12864DLWS-21	–
–	128 x 64	70.4 x 38.8	76.1 x 53.8 x 6.0	3.0, 18	S1D10605D COG	8bit	–	–	BY-MG12864DLYS-23	BB-MG12864DLWS-23	–
–	128 x 64	60.0 x 32.5	75.0 x 52.7 x 5.55	3.3	SPLC501C COG	8bit	4	–	BY-MG12864DLYS-24	BB-MG12864DLWS-24	–
–	128 x 64	60.0 x 32.5	75.0 x 52.7 x 9.0	5.0	S6B0107B	8bit	4	–	BY-MG12864DLYS-25	BB-MG12864DLWS-25	BG-MG12864DNS-25
–	128 x 64	61.0 x 31.4	67.15 x 48.15 x 5.55	3.3	NT7534 COG	8bit or Serial	4	–	BY-MG12864DLYS-26	BB-MG12864DLWS-26	–
–	128 x 64	32.0 x 17.8	35.2 x 27.95 x 4.4	3.3	NT7534 COG	8bit or Serial	4	–	BY-MG12864DLYS-27	BB-MG12864DLWS-27	–
–	128 x 64	51.0 x 28.0	55.2 x 43.2 x 5.55	3.3	NT7534 COG	8bit or Serial	4	–	BY-MG12864DLYS-28	BB-MG12864DLWS-28	–
–	128 x 64	70.7 x 38.8	76.1 x 53.8 x 6.7	3.0	S1D10605D COG	8bit	4	–	BY-MG12864DLYS-29	BB-MG12864DLWS-29	–
–	128 x 128	62.0 x 62.0	85.0 x 100.0 x 14.5	5.0	KS0107B	8bit	4	–	BY-MG128128DLYS-01	BB-MG128128DLWS-01	BG-MG128128DNS-01
–	128 x 128	50.0 x 50.0	63.2 x 62.2 x 4.5	3.0	ST7541 COG	Serial	4	–	BY-MG128128DLYS-03	BB-MG128128DLWS-03	–
–	128 x 128	50.0 x 50.0	60.0 x 62.0 x 6.5	3.0	NT7506 TAB	8bit	4	–	BY-MG128128DLYS-04	BB-MG128128DLWS-04	–
–	160 x 32	80.0 x 20.5	100.0 x 38.8 x 12.5	3.0, 7.0	AX6120DOA	8bit	–	–	BY-MG16032DLYS-01	BB-MG16032DLWS-01	BG-MG16032DNS-01
–	160 x 80	100.0 x 50.0	110.0 x 68.4 x 2.8	3.3	S1D15E06 COG	8bit	4	No B/L	–	–	BG-MG16080DNS-01
–	190 x 160	65.0 x 55.0	78.5 x 65.0 x 2.8	3.0, 14.5	ST7529 TAB	8bit or Serial	4	No B/L	–	–	BG-MG190160DNS-01
–	240 x 64	132.6 x 39.0	180.0 x 75.0 x 14.0	5.0	KS0107B	8bit	4	–	BY-MG24064DLYS-01	BB-MG24064DLWS-01	BG-MG24064DNS-01
–	240 x 64	132.6 x 39.0	180.0 x 65.0 x 14.0	5.0	T6963C	8bit	4	–	BY-MG24064DLYS-02	BB-MG24064DLWS-02	BG-MG24064DNS-02
–	240 x 64	114.0 x 35.0	149.0 x 57.0 x 13.0	5.0	KS0108B	8bit	4	EL B/L Option	–	–	BG-MG24064DNS-04
–	240 x 64	107.0 x 30.5	114.0 x 41.5 x 2.8	5.0	ST7529 COG	8bit	4	–	BY-MG24064DLYS-06	BY-MG24064DLWS-06	–
–	240 x 96	134.8 x 68.0	151.5 x 99.0 x 10.3	3.3, 9.2	S6A1713	8bit	–	–	BY-MG24096DLYS-01	BB-MG24096DLWS-01	–
–	240 x 128	114.0 x 64.0	144.0 x 104.0 x 11.0	5.0	T6963C	8bit	4	–	BY-MG240128DLYS-01	BB-MG240128DLWS-01	BG-MG240128DNS-01
–	240 x 128	114.0 x 64.0	144.0 x 104.0 x 11.0	5.0	T6963C	8bit	4	–	BY-MG240128DLYS-03	BB-MG240128DLWS-03	–
–	254 x 64	149.6 x 43.0	184.0 x 75.0 x 10.0	5.0	HD61830	8bit	4	No B/L	–	–	BY-MG25664DLYS-01
											Black FSTN + White LED Backlight
4.2	320 x 240	QVGA	93.8 x 66.6 x 6.9	5.0	NT7701H/02H	4bit	4	–	BY-MG320240DLWS-08	BB-MG320240DLWS-08	–
4.2	320 x 240	QVGA	93.8 x 66.6 x 6.9	5.0, 23.0	S1D13700F00	8bit	–	–	BY-MG320240DLWS-09	BB-MG320240DLWS-09	–
4.8	320 x 240	QVGA	143.0 x 96.8 x 11.0	5.0	NT7701H/02H	4bit	4	–	BY-MG320240DLWS-05	BB-MG320240DLWS-05	–
5.2	320 x 240	QVGA	160.0 x 109.0 x 12.0	5.0	HD66206	4bit	4	CCFL B/L	BY-MG320240DCS-21	BB-MG320240DCS-21	BF-MG320240DCS-21
5.2	320 x 240	QVGA	167.0 x 109.0 x 8.5	5.0	SED1335	8bit	4	–	BY-MG320240DLWS-34	BB-MG320240DLWS-34	–
5.5	320 x 240	QVGA	160.0 x 109.0 x 10.0	5.0	NT7701H/02H	4bit	4	–	BY-MG320240DLWS-06	BB-MG320240DLWS-06	–
5.5	320 x 240	QVGA	160.0 x 109.0 x 10.0	5.0, 23.0	SID13700F00	8bit	–	–	BY-MG320240DLWS-07	BB-MG320240DLWS-07	–
6.3	320 x 240	QVGA	143.0 x 96.8 x 11.0	5.0, 23.0	SID13700F00	8bit	–	–	BY-MG320240DLWS-10	BB-MG320240DLWS-10	–
6.3	320 x 240	QVGA	143.0 x 96.8 x 10.5	5.0, 23.0	SID13700QFP	4bit	–	–	BY-MG320240DLWS-11	BB-MG320240DLWS-11	–
6.3	320 x 240	QVGA	143.0 x 96.8 x 10.5	5.0	SID13700QFP	8bit	4	–	BY-MG320240DLWS-12	BB-MG320240DLWS-12	–
7.0	320 x 240	QVGA	160.4 x 109.4 x 13.5	5.0	NT7701H/02H	4bit	4	–	BY-MG320240DLWS-14	BB-MG320240DLWS-14	–
7.2	320 x 240	QVGA	167.0 x 109.0 x 10.0	5.0, 23.0	SID13700QFP	4bit	–	–	BY-MG320240DLWS-13	BB-MG320240DLWS-13	–

Character Displays



BONA

8 x 2 to 40 x 4 Screen Formats

Features

- **Choice of Passive Matrix**

  Displays are offered in STN but FSTN can also be supplied.

- **Positive & Negative Mode**

  The Yellow/Green STN and Grey STN displays listed are positive mode. The Blue STN displays listed are negative mode. Variations may be available upon request.

- **Viewing Direction Options**

  The normal viewing direction is 6 o'clock. Other viewing directions are available upon request.

- **Backlight Variants**

  Choice of LED or EL backlights for use with transflective or transmissive modules. LED colours are either white or yellow/green with the option of amber, blue, green or red.

- **Built-in Controller**

  An on-board controller is fitted to all models.

Introduction

A wide range of STN alphanumeric display modules from Bona Fide and Crystal Clear Technology, which offer a choice of formats, backlighting colours and LCD colours in reflective, transflective or transmissive modes. The table details the most popular combinations available but variations in their specification can be easily accommodated - please contact us to discuss your alternative requirements.

Specification

Optical

Yellow/Green backlit displays shown are transflective mode.
Blue Negative backlit displays shown are transmissive mode.
Non-backlit displays are reflective mode.

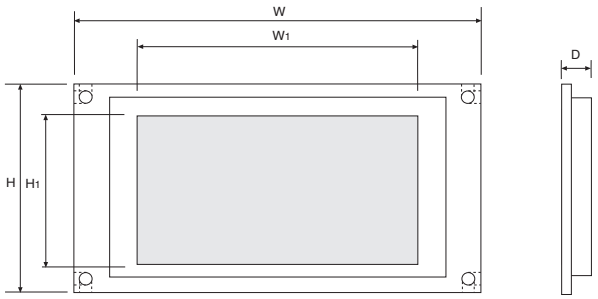
Environmental

Standard operating temperature range is 0 to +50°C.
Displays capable of handling a wider temperature range of -20 to +70°C or an extended range of -30 to +80°C can be supplied to special order.

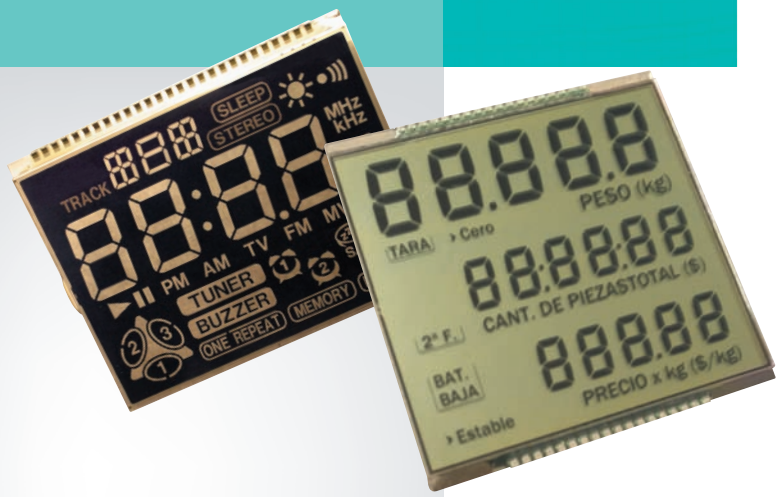
Tel: +44 (0)1945 47 46 45
Email: info@anglia-displays.com
www.anglia-displays.com

- Choice of Passive Matrix
- Positive & Negative Mode
- Viewing Direction Options
- Backlight Variants
- Built-in Controller

Module Dimensions (mm) & Viewing Area



Screen Format Char. x Lines	Viewing Area W1 x H1	Character Size Width x Height (mm)	Module Dimensions W x H x D (mm)	Supply Voltage (V)	On-Board Controller	Features	Part Number		
							Yellow/Green STN + Yell/Grn LED Backlight	Blue Negative STN + White LED Backlight	Grey STN Reflective
8 x 2	30.0 x 14.0	2.78 x 4.49	40.0 x 36.0 x 7.4	5.0, 4.5	KS0066U	EL B/L Option	BY-MC0802DLYS-01	BB-MC0802DLWS-01	BG-MC0802DNS-01
8 x 2	30.0 x 16.0	2.96 x 5.56	53.0 x 32.0 x 13.5	5.0, 4.5	KS0066U		BY-MC0802DLYS-04	BB-MC0802DLWS-04	BG-MC0802DNS-04
16 x 1	64.5 x 13.8	3.2 x 6.35	80.0 x 36.0 x 13.0	5.0, 4.5	KS0066U		BY-MC1601DLYS-01	BB-MC1601DLWS-01	BG-MC1601DNS-01
16 x 1	64.5 x 14.0	3.2 x 6.35	80.0 x 36.0 x 13.0	5.0, 4.5	KS0066U		BY-MC1601DLYS-02	BB-MC1601DLWS-02	BG-MC1601DNS-02
16 x 1	61.0 x 15.8	3.15 x 7.9	80.0 x 36.0 x 13.0	5.0, 4.5	KS0066U		BY-MC1601DLYS-05	BB-MC1601DLWS-05	BG-MC1601DNS-05
16 x 2	99.0 x 24.0	4.84 x 9.86	122.0 x 44.0 x 14.0	5.0, 5.0	KS0066U		BY-MC1602DLYS-03	BB-MC1602DLWS-03	BG-MC1602DNS-03
16 x 2	65.6 x 16.0	2.95 x 5.55	84.0 x 44.0 x 13.0	5.0, 5.0	KS0066U		BY-MC1602DLYS-04	BB-MC1602DLWS-04	BG-MC1602DNS-04
16 x 2	56.2 x 15.9	2.95 x 5.55	66.6 x 23.3 x 7.5	5.0, 4.5	KS0066U	COG	BY-MC1602DLYS-05	BB-MC1602DLWS-05	BG-MC1602DNS-05
16 x 2	61.0 x 51.7	2.95 x 5.55	68.6 x 21.7 x 5.8	5.0, 4.5	KS0066U	COG	BY-MC1602DLYS-06	BB-MC1602DLWS-06	BG-MC1602DNS-06
16 x 2	65.6 x 16.0	2.95 x 4.35	79.5 x 35.5 x 12.7	5.0, 5.0	KS0066U		BY-MC1602DLYS-13	BB-MC1602DLWS-13	BG-MC1602DNS-13
16 x 2	65.6 x 16.0	2.95 x 5.55	79.5 x 35.5 x 13.0	5.0, 5.0	KS0066U		BY-MC1602DLYS-17	BB-MC1602DLWS-17	BG-MC1602DNS-17
16 x 2	64.4 x 13.8	2.95 x 4.35	79.5 x 35.5 x 13.0	5.0, 5.0	KS0066U		BY-MC1602DLYS-18	BB-MC1602DLWS-18	BG-MC1602DNS-18
16 x 2	61.0 x 15.7	2.95 x 5.15	65.0 x 27.7 x 2.7	5.0, 3.0	NT7603	EL B/L Option, COG	–	–	BG-MC1602DNS-20
16 x 2	61.0 x 16.0	2.95 x 5.55	85.0 x 32.5 x 13.0	5.0, 5.0	KS0066U		BY-MC1602DLYS-21	BB-MC1602DLWS-21	BG-MC1602DNS-21
16 x 4	61.8 x 25.2	2.95 x 4.75	87.0 x 60.0 x 14.0	5.0, 5.0	KS0066U		BY-MC1604DLYS-01	BB-MC1604DLWS-01	BG-MC1604DNS-01
16 x 4	61.8 x 25.2	2.95 x 4.76	87.0 x 60.0 x 15.0	5.0, 5.0	SPLC780		BY-MC1604DLYS-02	BB-MC1604DLWS-02	BG-MC1604DNS-02
20 x 2	85.0 x 19.8	3.2 x 5.55	116.0 x 39.0 x 10.0	5.0, 5.0	KS0066U		BY-MC2002DLYS-01	BB-MC2002DLWS-01	BG-MC2002DNS-01
20 x 2	85.0 x 19.8	3.2 x 5.55	116.0 x 37.0 x 14.0	5.0, 5.0	KS0066U		BY-MC2002DLYS-02	BB-MC2002DLWS-02	BG-MC2002DNS-02
20 x 2	85.0 x 19.8	3.2 x 5.55	116.0 x 37.0 x 14.0	5.0, 5.0	KS0066U		BY-MC2002DLYS-03	BB-MC2002DLWS-03	BG-MC2002DNS-03
20 x 2	83.4 x 18.6	3.2 x 5.55	108.0 x 37.0 x 11.5	5.0, 4.5	KS0066U		BY-MC2002DLYS-06	BB-MC2002DLWS-06	BG-MC2002DNS-06
20 x 2	123.2 x 23.0	4.9 x 8.3	146.0 x 62.5 x 13.5	5.0, 4.5	KS0066U		BY-MC2002DLYS-07	BB-MC2002DLWS-07	BG-MC2002DNS-07
20 x 2	61.0 x 15.1	2.45 x 5.55	69.5 x 25.05 x 6.2	5.0, 4.5	NT7605	COG	BY-MC2002DLYS-08	BB-MC2002DLWS-08	BG-MC2002DNS-08
20 x 2	83.4 x 18.6	3.20 x 5.55	116.0 x 37.0 x 14.0	5.0, 4.5	KS0066U		BY-MC2002DLYS-09	BB-MC2002DLWS-09	BG-MC2002DNS-09
20 x 4	76.0 x 25.2	2.95 x 4.75	98.0 x 60.0 x 13.3	5.0, 4.4/5.4	KS0066U		BY-MC2004DLYS-01	BB-MC2004DLWS-01	BG-MC2004DNS-01
20 x 4	85.0 x 30.5	3.45 x 6.35	98.0 x 60.0 x 14.0	5.0, 4.5	KS0066U		BY-MC2004DLYS-06	BB-MC2004DLWS-06	BG-MC2004DNS-06
20 x 4	123.0 x 42.5	4.95 x 9.23	98.0 x 60.0 x 13.5	5.0, 4.5	KS0066U		BY-MC2004DLYS-07	BB-MC2004DLWS-07	BG-MC2004DNS-07
24 x 2	93.5 x 15.80	3.2 x 5.55	118.0 x 36.0 x 14.0	5.0, 4.4/5.3	KS0066U		BY-MC2402DLYS-01	BB-MC2402DLWS-01	BG-MC2402DNS-01
24 x 2	83.4 x 18.6	2.7 x 5.55	108.0 x 37.0 x 11.5	5.0, 4.5	KS0066U		BY-MC2402DLYS-04	BB-MC2402DLWS-04	BG-MC2402DNS-04
40 x 2	154.0 x 15.8	3.2 x 5.55	182.0 x 33.5 x 14.0	5.0, 4.3/5.3	KS0066U		BY-MC4002DLYS-01	BB-MC4002DLWS-01	BG-MC4002DNS-01
40 x 4	147.0 x 29.5	2.78 x 4.89	190.0 x 54.0 x 11.0	5.0, 4.3/5.3	KS0066U		BY-MC4004DLYS-01	BB-MC4004DLWS-01	BG-MC4004DNS-01
40 x 4	143.8 x 26.7	2.78 x 4.89	190.0 x 54.0 x 15.0	5.0, 4.5	KS0066U		BY-MC4004DLYS-04	BB-MC4004DLWS-04	BG-MC4004DNS-04



BONA

Monochrome LCD

Custom Options

These include :

- Custom screen icons on LCD glass
- Custom icons added to standard displays
- Wide temperature specifications
- Touch panels
- EL backlights
- LED backlights in white or colour
- LCD colour
- Negative mode
- Viewing angle
- Reflective, transflective and transmissive
- Driver IC selection
- Connector variations

Introduction

For customers who require a monochrome LCD display that is not featured in this brochure Anglia Displays are able to offer a wide variety of custom made products from Bona Fide in TN, HTN, STN, FSTN, CSTN and TFT. They range from 7-Segment displays with custom icons through to 320 x 240 dot graphic displays with a touch panel.

Depending on the level of customisation and value of the finished product minimum order quantities will vary from low to medium volume.

The Custom Process

The process consists of the following steps:

1) Customer submits a drawing of the desired display icons and layout.
2) Bona Fide produces a drawing to base production upon.
3) Customer accepts or amends the manufacturing drawing.
4) Samples are produced for customer test and approval.
5) Customer approves the samples or requests final changes.
6) Once the customer is satisfied with samples the first production batch can be made.

Custom parts are 100% tested. Estimated total time for the custom process 12-16 weeks.

Chip Mounting Technology

Chip on glass (COG)
Chip on board (COB)
Chip on tab (TAB)

Tel: +44 (0)1945 47 46 45
Email: info@anglia-displays.com
www.anglia-displays.com

Where can Custom LCD displays be used?

Custom displays can be seen in numerous applications :

- Medical
- Telecom
- Control Panels
- HVAC
- Security
- Process Control
- Recreational
- Portable
- Handheld

The right information

To enable us to understand what you require of your 'Custom' display, we need you to answer some basic questions, such as layout, background colour, size, reflective, transflective or transmissive, LCD driver etc. All these options and more can be discussed with our experienced display engineers, who will guide you through the products and options to give you exactly what you require and make your design unique.

The right guidance

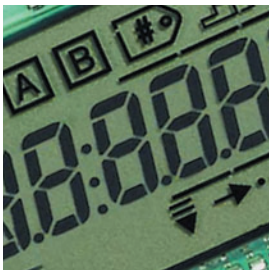
We can offer different types of backlights, and there may also be a need to enhance your design further with bespoke keypads (see page 42 for further details). Again, these matters can be dealt with during our discussions. With our help we can save you time and money, making sure that your project will run smoothly and speed up your time to market.

For more information on Custom displays or to discuss your requirements, phone or email us on the details below.

- Monochrome LCD
- Wide variety of display technologies to choose from
- Extensive list of customisation options
- Choice of chip mounting technology

Need to know more

Then contact our experienced technical team. Phone them on +44 (0)1945 47 46 45 or email info@anglia-displays.com. Alternatively, visit us at www.anglia-displays.com



SOLOMON SYSTECH

Display Controllers

Introduction

Solomon Systech's SSD1960/61/62/63 Display Controllers are ideal for portable and handheld applications that require a high-resolution display.

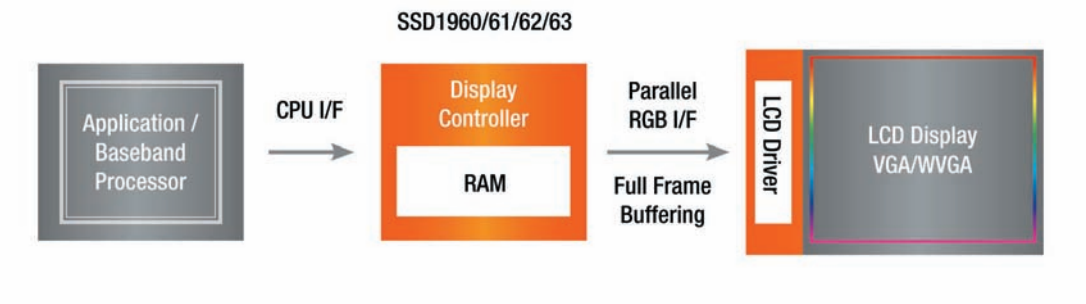
These controllers contain an embedded SRAM which serves as a frame buffer between the host processor and the LCD panel. The chips support 8/9/16/18-bit indirect CPU interface and 18/24-bit RGB LCD interface. The feature set includes hardware display rotation (0°, 90°, 180° and 270°), mirroring and windowing, and display enhancement such as brightness, contrast and saturation control.

Power consumption is one of the biggest challenges in designing electronic equipment, especially for battery-operated devices. As the LCD display increases in size and resolution, the backlight becomes the most power consuming part in the system.
The SSD1960/61/62/63 controllers feature the Solomon Systech's Dynamic Backlight Control (DBC) technology which brings added value to portable device manufacturers without sacrificing the display quality of the end products.

Need to know more

Then contact our experienced technical team. Phone them on +44 (0)1945 47 46 45 or email info@anglia-displays.com. Alternatively, visit us at www.anglia-displays.com

APPLICATION DIAGRAM



SELECTION GUIDE

Part Number :		SSD1960	SSD1961	SSD1962	SSD1963
Host MCU Interface	6800 (8/16/18-bit)		√		
	8080 (8/16/18-bit)		√		
Internal RAM Size		170KB	675KB	912KB	1215KB
Display Feature	Display Rotation		√		
	Display Mirror		√		
	Display Windowing		√		
Panel Support	Serial TFT		6-bit		8-bit
	Parallel TFT		18-bit		24-bit
	Typical Resolution	320 x 240/18bpp	640 x 480/18bpp	864 x 480/18bpp	864 x 480/24bpp
			480 x 320/18bpp	800 x 480/18bpp	800 x 480/24bpp
	Dynamic Backlight Control		√		
Miscellaneous	Core Voltage		1.2V +/- 10%		
	Host I/O Voltage		1.8/3.3V +/- 10%		
	Panel I/F Voltage		1.8/3.3V +/- 10%		
	Package		TFBGA-64		TFBGA-80
					LQFP-128

Resolution/Colour Depth/Memory Requirements

Display Dimensions		Resolution/Colour Depth/Memory Requirements in (Bytes)				
Vertical	Horizontal	1 bpp (Mono)	2 bpp (4 colour)	4 bpp (16 colours)	8 bpp (256 Colours)	16bpp (65K Colours)
480	272	16,320	32,640	65,280	130,560	261,120
320	240	9,600	19,200*	38,400	76,800	153,600
160	240	4800	9,600	19,200*	38,400	76,800
160	160	3,200	6,400	12,800	25,600	51,200
128	64	1,024	2,048	4,096	8,192	16,384

(* May need to switch to DA devices with 96KB RAM)

– For DA devices with 96KB SRAM

– For DA devices with 24KB SRAM

– For DA devices with 24KB SRAM with ext. SRAM

SOLOMON SYSTECH

Graphic Controllers

Introduction

Electronic displays interconnect with the information world. Increase in display size, resolution and graphic manipulation tend to be the demanding factors. To keep pace with this trend, Solomon Systech proudly offers a series of Graphic Controllers that are suitable for any portable or handheld device with an LCD panel.

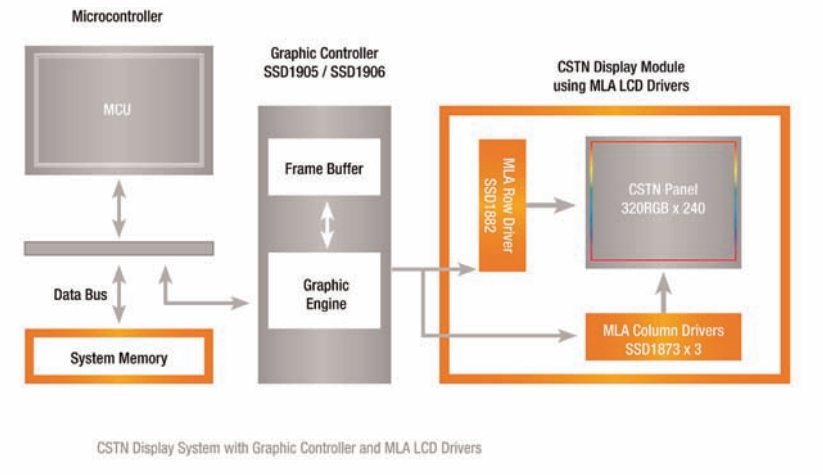
In a single chip, Solomon Systech's SSD1905/1906 LCD Graphic Controllers handle the entire image rendering and STN/TFT display interfaces to provide a content rich display. Both ICs can interface with almost any kind of MCU, including low-cost 8-bit MCUs. An embedded SRAM frame buffer memory of 80K bytes (for SSD1905) / 256K bytes (for SSD1906) can support from 1 bit-per-pixel with 2 grey shades up to 16 bit-per-pixel colours with 64 grey shades.

To reduce software manipulation for animation display, the on-chip graphic engine provides command type graphic manipulation such as display rotation, window mode, cursor mode, and so on.

Need to know more

Then contact our experienced technical team. Phone them on +44 (0)1945 47 46 45 or email info@anglia-displays.com. Alternatively, visit us at www.anglia-displays.com

APPLICATION DIAGRAM



CSTN Display System with Graphic Controller and MLA LCD Drivers

SELECTION GUIDE

Part Number :		SSD1905	SSD1906
Embedded Display Buffer Memory		80KB	256KB
MCU Interface	Control Pins	Enhanced 6800, 8080, Generic #1, Generic #2, Control Interface, with Wait Option	
	Data Bus	8 or 16 Bit	√
	Address Bus	Separated Bus Required	
Panel Support	STN or CSTN (4bit/8bit)	√	
	Parallel TFT	9/12/18-bit	
Display Features	Display Rotation	√	
	Display Colour Invert	√	
	Multi-page Buffering	√	
	Colour Look-up table	√	
	Floating Window	√	
	Virtual Display	√	
	Hardware Cursors	√	
	Typical Resolution	160 x 160/16bpp	320 x 240/16bpp
	Colour Depth	1/2/4/8/16 bpp	
Power	MCU Interface	3.0V - 3.6V	
	Main Panel Interface	3.0V - 3.6V	
	Core Voltage	2.5V (by Internal Regulator)	
	Power Consumption	~ 2mW to 50mW Depends on Screen, Colour and Resolution	
Miscellaneous	GPIO Pins	√	
	PWM and CV	√	
	Package	TQFP-100	

SOLOMON SYSTECH

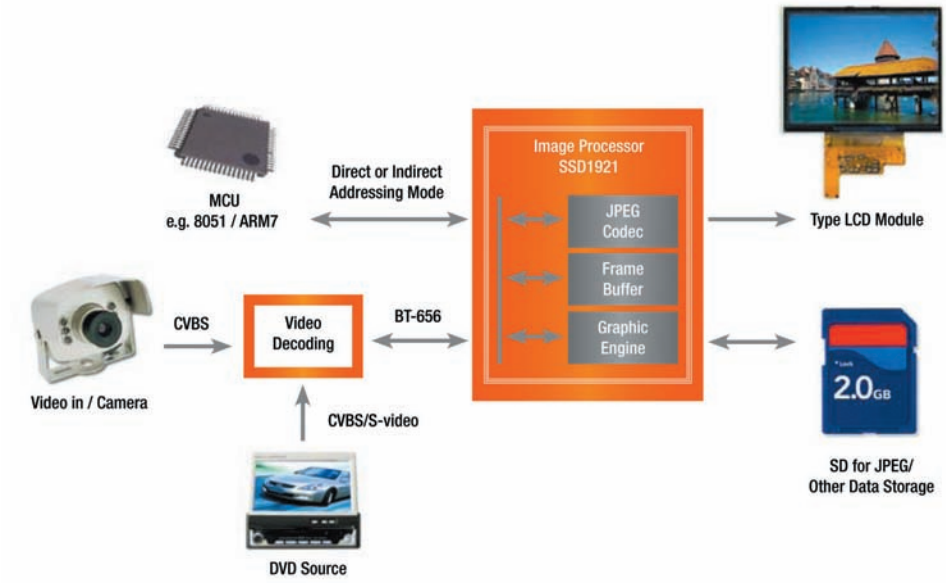
Image Processors

Introduction

Display contents including animated graphics, OSD menus with customised fonts/icons, DVD movies and JPEG photos are becoming an essential factor in portable and handheld electronic devices nowadays. Solomon Systech's SSD1921/1926/1928 Image Processors are powerful imaging engines that bring the above dreams to reality.

The system solutions provide advantages in lower power consumption, stable display performance and flexible platform component selection. The 256KB embedded frame buffer in the SSD1921/1926/1928 processors can support 960x240 delta panels and 480xRGBx234 strip panels. Comprehensive support such as hardware schematics and software API is provided to expedite product launch.

Application Diagram:



Tel: +44 (0)1945 47 46 45
Email: info@anglia-displays.com
www.anglia-displays.com

SELECTION GUIDE

Part Number			SSD1921	SSD1926	SSD1928
Host MCU Interface	Direct Addressing	8bit I/F		√	
		16bit I/F		√	
	Indirect Addressing	8bit I/F		√	
		16bit I/F		√	
Internal RAM Size				256KB	
Camera / Video Interface (BT-656)	Camera I/F		√	–	√√
	Camera Resolution		2Mpx	–	2Mpx
	I2C Master		√	–	√
	YUV/Raw Data Capture		√	–	√
	Resize (View/Capture)		√	–	√
Display Feature	GC Functions Support (Display Rotation, Colour Invert, Multi-page Buffering, Colour LUT, Overlay Window, 2 Hardware Cursors)			√	
	Colour Depth			1,2,4,8,16,32 bpp	
	YUV <--> RGB			√	
	P-in-P+			√	
	Fractional Shrink			√	
	Fractional Zoom			√	
	Mirror Display			√	
Graphic Acceleration	JPEG Encoder		2Mpx	–	2Mpx
	JPEG Decoder			Up to 16M (4K x 4K)	
	Motion JPEG		Encode/Decode	Decode Only	Encode/Decode
	BitBLT			√	
	Draw Lines			√	
	Draw Circles			√	
	Colour Fill			√	
	Colour Expansion			√	
Panel Support	Display By-pass Access			√	
	Main Panel			MCU Mode or RAM-less Driver Mode	
	STN or CSTN (4bit / 8bit) / 8-bit Delta			√	
	Serial 8-bit TFT			√	
	Parallel TFT		18-bit	24-bit	–
	Typical Resolution			320 x 240/16bpp, 480 x 234/ 16bpp	
	Maximum Resolution / Colour Depth			320 x 200/32bpp, 800 x 600/2bpp	
Miscellaneous	Power Save Mode			√	
	GPIO Pins			√	
	SD Card I/F			√	
	Core Voltage			1.8V +/-10%	
	Host I/O Voltage			3.0V +/-10%	
	Panel I/F Voltage			3.0V +/-10%	
	Package		LQFP-144	LQFP-128	LQFP-128

Introduction

The following pages detail a selection of Embedded and Industrial computer products from Avalue's extensive range. These products are tailored to suit a wide variety of applications where time to market is important by allowing the designer to take a modular approach to system design.

The selection consists of Embedded single board computers (SBC), Industrial motherboards, Embedded systems and Panel PC products, and includes a wide choice of options such as processor core enabling designers to select the best performance/cost balance for the application's requirement.

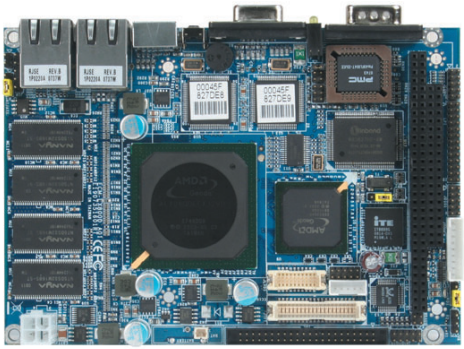
The entry level Embedded SBC products come with a choice of high performance CPU's including ARM based cores. The Industrial motherboards offer reliable performance based around X86 architecture and come in standard form factors Mini ITX & Nano ITX with other form factors available. The Embedded systems take the Embedded SBC and Industrial motherboards and house them conveniently in a ruggedised case with multiple I/O connections & fanless cooling for extended reliability. The theme is taken a step further with the Panel PC products which incorporate the display with touch screen control.

Finally, a wide range of complementary interface Accessory cards are offered with LVDS, VGA, TV-out, USB/Serial and Panel-Link functionality.

Avalue are also able to offer a fully customised solution to suit your application's individual requirement. Please contact us for more details of this service.

3.5" AMD LX800 Micro Module

ECM-LX800D



FEATURES

- Onboard AMD Geode LX800 @ 0.9 W 500 MHz CPU
- AMD Geode LX800 / CS5536 Chipset
- Onboard 256 MB Memory (Optional up to 512 MB)
- LVDS, 2-CH Audio
- Dual Realtek RTL8101L LAN
- 1 CF, 1 PC/104, 2 COM, 2 USB , 8-bit GPIO
- Optional Built-in Touch Screen Interface
- Fanless Operation
- Wide Voltage: +10V~+28V

Fanless | LVDS | 2 LAN | PC/104 | Touch Screen | LX800 @ 0.9W | 8 GPIO | Wide Voltage

SPECIFICATION

System

CPU	Onboard AMD Geode LX800 @ 0.9 W 500 MHz CPU
BIOS	Award 4 Mbit Flash BIOS
System Chipset	AMD Geode LX800 / CS5536
I/O Chip	Winbond W83627HG-AW
System Memory	Onboard 256MB DDR Memory, optional 512MB
SSD	One CompactFlash Type I/II socket
Watchdog Timer	Reset: 1 sec.~255 min. and 1 sec. or 1 min./step
H/W Status Monitor	Monitoring system temperature, voltage with auto throttling control
Expansion	1 PC/104

I/O

MIO	1 x EIDE (Ultra DMA 100), 1 x RS-232, 1 x RS-232/422/485, 1 x K/B & Mouse, 1 x LPT
IrDA	115k bps, IrDA 1.0 compliant
USB	2 x USB 2.0
DI/O	8-bit GPIO

Display

Chipset	AMD Geode LX800 Integrated
Display Memory	8/16/32/64/128/254 MB frame buffer using system memory
Resolution	CRT mode: 1920 x 1440 @ 32 bpp (85 Hz)
	TFT: 1600 x 1200 @ 16 bpp (60 Hz)
Multiple Display	CRT + LVDS, CRT + TTL
VGA/LCD interface	Support 18/24-bit CRT+TFT panel
LVDS	Single-channel 18-bit LVDS optional 24-bit

Audio

AC97 Codec	Realtek ALC203 supports 2-CH Audio
Audio Interface	Mic in, Line in, Audio in, Line out

Ethernet

LAN	Dual Realtek RTL8101L
Ethernet Interface	100 Base-Tx Fast Ethernet compatible

MECHANICAL & ENVIRONMENTAL

Power Consumption	+10V~+28V
Power Type	AT / ATX
Operation Temperature	0~60°C
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	146 mm x 101 mm (5.7" x 4")
Weight	0.2 kg

Description	Part Number
3.5" AMD LX800 Micro Module	ECM-LX800D

Nuvoton W90P910 ARM9 RISC CPU Module

RSC-W910

FEATURES

- Nuvoton W90P910 ARM9 CPU
- Onboard 64MB SDRAM, Optional 128MB
- 16~18-bit TTL / AC97 Audio
- 10/100 Mbps LAN
- 1 x RS-232, 1 x RS-232/485, 3 USB 2.0
- +9V ~ +24V DC Input
- -20~60°C Operating Temperature
- Windows CE 5.0/6.0 & Linux
- Optional Onboard Battery Charger, Touch I/F

SPECIFICATION

System

CPU	Nuvoton W90P910 ARM926 32-bit CPU
Bootloader	NAND/NOR Flash
Flash Memory	Onboard 128MB, Optional 512MB
System Memory	Onboard 64MB SDRAM, Optional 128MB
SSD	SD

I/O

MIO	1 x RS-232, 1 x RS-232/485, 16 DIO, 1 PS2 (optional)
USB	3 USB Ports

Display

Resolution	800 x 600 @ 60 Hz
LCD Interface	16~18-bit TTL

Audio

AC97 Codec	Realtek ALC203 AC97 codec
Audio Interface	Line-out, Mic-in
Built-in Touch Screen	Optional
Chipset	Optional

Ethernet

Chipset	Onchip MAC + PHY
Ethernet Interface	10/100 Base-Tx Fast Ethernet Compatible

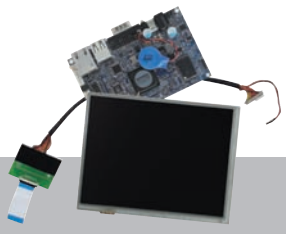
OS Support

Linux	Kernel version: 2.6.17
WinCE	5.0/6.0

MECHANICAL & ENVIRONMENTAL

Power Requirement	+9V~+24V DC Input
Battery	Optional Battery Charger
Operating Temperature	-20~60°C
Operating Humidity	0%~90% relative humidity, noncondensing
Size (L x W)	110 mm x 70 mm
Weight	0.2 kg

Description	Part Number
Nuvoton W90P910 ARM9 RISC CPU Module	RSC-W910

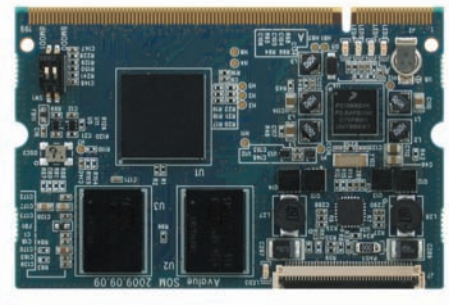


Did you know?

Anglia Displays have available a selection of 'Springboard' evaluation kits based on a RISC SBC platform. The platform is available with a variety of displays and display sizes from 2.7" to 9.0" with or without touch screen. We would be happy to discuss your requirements with you, so contact us today!

Freescale i.MX515 SOM Module

RSM-MX515



FEATURES

- Onboard Freescale i.MX515 SoC
- Onboard AUDIO/ Touch/ PWM Companion Chip
- DDR2 SDRAM 128MB & 256MB NAND Flash
- Supports Open GL ES 2.0 + OpenVG 1.1, H/W Video Codecs
- 2 SDIO, 1 ATA, 1 USB Host, 1 USB OTG, 3 UARTs (on SODIMM Slot)

Freescale i.MX515 | NAND Flash | Built-in RTC | 2 SDIO

1 ATA | 1 USB Host | 1 USB OTG | 3 UARTs

SPECIFICATION

System

CPU	Freescale i.MX515 SoC Up to 1GHz CPU
Boot Loader	NAND Flash Memory
Companion Chipset	Supports AUDIO/ Touch/ PWM Companion IC Integrated
System Memory	Onboard DDR2 SDRAM 128MB, at 200MHz
NAND Flash	Onboard 256MB NAND Flash Memory
RTC	Built-in

I/O

MIO	2 x SDIO, 1 x ATA, 2 x I2C, 3 x UARTs
USB	1 x USB Host, 1 x USB OTG
DIO	16-bit Programmable GPIO

Display

Chipset	Freescale i.MX515 SoC
Resolution	CRT Mode: 1024 x 768 @ 75 Hz
	LCD /Simultaneous Mode: 1024 x 768 @ 75Hz

Audio

Chipset	AUDIO CODEC Integrated on Companion Chip

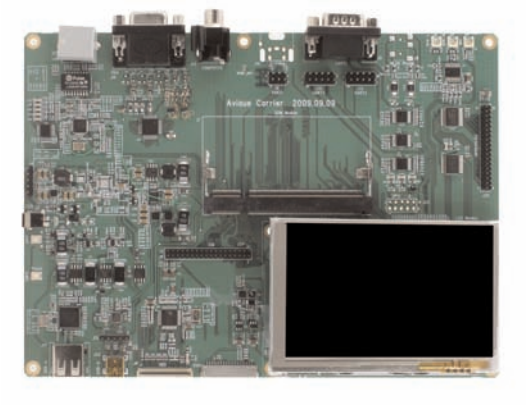
MECHANICAL & ENVIRONMENTAL

Power Requirement	DC-in 5V
Operating Temperature	0~60°C
Operating Humidity	0%~90% Relative Humidity, Non-condensing
Size (L x W)	67mm x 44 mm
Weight	0.01kg

Description	Part Number
Freescale i.MX515 SOM module	RSM-MX515

5.25” SOM Carrier Board

EEV-R51



FEATURES

- Accept RSM-MX515 SOM Module
- VGA & LVDS
- Audio & TV-out Interface
- 10/ 100bps LAN
- 1 x USB Host, 1 x USB OTG, , Touch Controller
  3 x UARTs (or 2 x UARTs & 1 x IrDA)
- 2 SDIO, 1 ATA
- 16-bit Programmable GPIO

LVDS | TV-out | LAN | 1 USB Host | 1 USB OTG
3 UARTs | 2 SDIO | 1 ATA | 16 GPIO | Touch Controller

SPECIFICATION

System

Form Factor	Industrial 5.25" Form Factor
SOM Socket	One 200-pin SODIMM Connector
SSD	2 x SDIO

Built-in Touch Screen

Chipset	Companion Chip on SOM
Touch Screen Interface	Support 1x Touch Controller (Optional)

I/O

MIO	2 x SDIO, 1x ATA, 2 x I2C, 3 x RS-232
IrDA Connector	1 x Fast IrDA (5 x 1 Header, Pitch 2.54mm) (Optional)
USB Connector	1 x USB Host, 1 x USB OTG
GPIO	GPI/O Connector (Two 8 x 1 Header, Pitch 2.54mm)

Audio

Chipset	Companion Chip on SOM
Amplifier	2W (1W + 1W)
Audio Interface	Line-in, Mic-in, Line-out (with Audio Triple Jack)

Ethernet

Interface	Controller on Carrier Board

Connectors

External Connector	1 x DSUB15 (VGA), 1 x DSUB9 (RS-232), USB Host Port, 1 x RJ45, Audio Jack
UART	Two 5 x 2 Header, Pitch 2.54mm
USB OTG	One 5 x 1 Header, Pitch 2.54mm
LVDS Connector	One HIROSE DF13-40DP-1.25V
TV-out Connector	One 3 x 2 Header, Pitch 2.54mm
Audio Connector	4 x 1 Wafer (Non Amplifying)
Power Connector	1 x DC Jack

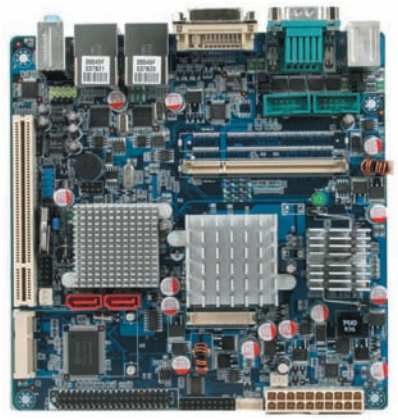
MECHANICAL & ENVIRONMENTAL

Power Requirement	DC-in 12V
Power Type AC to	DC Adapter
Operating Temperature	0~60°C
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	203mm x 146mm (8" x 5.75")
Weight	0.17 kg

Description	Part Number
5.25” SOM Carrier Board	EEV-R51

Intel® 945GSE Atom™ N270 Mini ITX Motherboard

EMX-945GSE



FEATURES

- Onboard Intel® XFCBGA 45nm Atom™ N270 1.6 GHz Processor
- Intel® 945GSE / ICH7-M Chipset
- One 200-pin SODIMM up to 2GB DDR2 533 SDRAM, non-ECC
- Intel® Graphics Media Accelerator 950
- Dual View, 2-CH LVDS
- DVI for EMX-945GSE-A1-DVIR only
- 5.1-CH HD Audio, 6W AMP
- Dual Realtek RTL8111C Gigabit Ethernet
- 1 PCI 2.3, 1 Mini PCIex1
- 1 CF, 4 powered COM, 2 SATA, 6 USB, 8-bit GPIO

2 GbE | Dual View | LVDS | Atom | CF
PCI | 6 USB | 4 COM | DDR2 | 8 GPIO
5.1 CH | Intel 945GSE | Mini PCIe | 2 SATA

SPECIFICATION

System

CPU	Onboard Intel® XFCBGA 45nm Atom™ N270 1.6 GHz Processor
FSB	533 MHz
BIOS	Award 4 Mb Flash BIOS
System Chipset	Intel® 945GSE / ICH7
I/O Chip	Winbond W83627DHG-A
System Memory	One 200-pin SODIMM up to 2GB DDR2 533 SDRAM, non-ECCSDRAM
SSD	1 Type I/II CF
H/W Status Monitor	Monitoring CPU temperature and voltage with auto throttling control
Expansion	1 PCI, 1 Mini PCIex1

I/O

MIO	1 x IDE, 2 x SATA, 4 x COM (5V/12V), 1 x K/B, 1 x Mouse
USB	6 x USB 2.0
DI/O	8-bit GPIO

Display

Chipset	Intel® 945GSE GMCH integrated Graphics Media Accelerator 950
Display Memory	Intel® DVMT 3.0 supports up to 224 MB shared video memory
Resolution	CRT Mode: 2048 x 1536 @ 75 Hz; LCD Mode: 1920 x 1200 @ 60 Hz
Multiple Display	CRT+DVI / CRT+LVDS / DVI+LVDS
VGA/LCD Interface	Onboard GMA 950,supports for CRT resolutions up to QXGA
LVDS	2-CH 18-bit LVDS (EMX-945GSE-A1-DVIR); 2-CH 18/24-bit LVDS (EMX-945GSE-A1R)
DVI	Chrontel CH7307C DVI transmitter up to 165M pixels/second (for EMX-945GSE-A1-DVIR only)

Audio

Chipset	Intel® ICH7-M
AC97 Codec	Realtek ALC888, 5.1+2-CH HD Audio, 6 W AMP
Audio Interface	Mic in, Line in, (CD Audio in), Line out

Ethernet

LAN	Dual Realtek RTL8111C Gigabit Ethernet

TPM

Chipset	TPM (Infineon SLB 9635 TCG 1.2 compliant)

MECHANICAL & ENVIRONMENTAL

Power Type	ATX
Operation Temperature	0~60°C
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	170 mm x 170 mm
Weight	0.4 kg

Description	Part Number
Intel® 945GSE Atom™ N270 Mini ITX Motherboard	EMX-945GSE

Intel® Atom™ Z5xx Nano ITX Motherboard

ENX-US15WP

FEATURES

- Onboard Intel® Atom™ Z5xx series CPU
- Intel® US15WP (Single chip SCH, GMCH+ICH)
- 2D/3D graphics acceleration supports Direct X9, EMV9, H.264.A and MPEG2 video decoding
- One 200-pin SODIMM up to 2 GB DDR2 400/533 SDRAM
- Dual View, VGA, LVDS
- Realtek ALC888 Supports 7.1-CH HD Audio
- 1 COM, 4 USB, 8-bit GPIO
- 1 Mini PCIe, 1 CF
- Optional TPM

LVDS | Audio | GbE | Atom | CF | 4 USB | 8 GPIO | Mini PCIe | 1 COM

SPECIFICATION

System

CPU	Onboard Intel® Atom™ Z510P 1.1 GHz/Z530P 1.6GHz CPU
FSB	533 MHz
BIOS	Award 4 Mb Flash BIOS
System Chipset	Intel® US15WP (Single chip SCH, GMCH+ICH)
I/O Chip	Winbond W83627DHG-A
System Memory	One 200-pin SODIMM socket supports up to 2 GB DDR2 400/533 SDRAM
SSD	One CompactFlash Type I/II socket
Watchdog Timer	Reset: 1 sec.~255 min. and 1 sec. or 1 min./step
H/W Status Monitor	Monitoring CPU temperature, voltage, and fan status with auto throttling control
Expansion	1 Mini PCIe

I/O

MIO	1 x IDE, 1 x COM(pin-header), 1 x K/B+Mouse
USB	4 x USB 2.0
TPM	optional
DI/O	8-bit General Purpose I/O for 4-bit DI and 4-bit DO

Displays

Chipset	US15WP, Direct X9 supports EMV9, H.264.A and MPEG2 video decoding
Display Memory	Intel® Graphics Media Accelerator 500
Resolution	LVDS mode: 1366 x 768 @85 Hz; Ext Display: 1280 x 1024 @ 85 Hz
Multiple Display	VGA + LVDS
LVDS	Single channel 18/24-bit LVDS

Audio

AC97 Codec	Realtek ALC888 (co-lay ALC 888VC) Supports 7.1-CH Audio
Audio Interface	Mic in , Line out (2 jack) , Line- in pin-header

Gigabit

Chipset	Realtek RTL 8111C Gigabit Ethernet

MECHANICAL & ENVIRONMENTAL

Power Type	ATX
Operation Temperature	0~60°C
Operating Humidity	0%~90% relative humidity, non-condensing
Size (L x W)	120 mm x 120 mm
Weight	0.4 kg

Description	Part Number
Intel® Atom™ Z5xx Nano ITX Motherboard	ENX-US15WP

Intel® 945GME Core™ 2 Duo Tiny Embedded System

EPC-945

FEATURES

- Supports 65nm Intel® μFC-PGA 478 / μFC- BGA 479 Core™ 2 Duo / Core™ Duo / Celeron® M CPU
- Intel® 945GME / ICH7-M Chipset
- One 200-pin SODIMM supports up to 2 GB DDR2 400/533/667 SDRAM
- Dual Gigabit Ethernet
- 1 CF, 1 COM, 3 USB
- Supports 2.5" SATA HDD

2 GbE | CF | Intel 945GME | 3 USB | 1 COM

Description	Part Number
Intel® 945GME Core™ 2 Duo Tiny Embedded System	EPC-945

Fanless VIA Eden V4 Tiny Embedded System

EPC-3711

FEATURES

- Onboard VIA Eden V4 CPU
- Dual LAN
- 1 Mini PCI, 1 CF, 1 COM, 3 USB 2.0
- Supports 2.5" SATA HDD
- Fanless & +5V Operation

Dual LAN | 1 Mini PCI | CF | 3 USB 2.0 | 1 COM

Description	Part Number
Fanless VIA Eden V4 Tiny Embedded System	EPC-3711

8” ARM9 Based Fanless Panel PC

RPC-0801

FEATURES

- 8” ARM9 Based Panel PC
- Onboard Nuvoton W90P910 ARM9 200MHz SoC
- Onboard 64MB SDRAM (Up to 128MB)
- Onboard 2MB NOR Flash (Boot System)
- Onboard 128MB NAND Flash (Storage)
- Single-Channel 8/ 16/ 18-bit TTL, AC97 Audio
- 1 COM, 2 USB, SD Socket
- 10/ 100 LAN in RJ-45, Optional Support POE (802.af)
- Optional Onboard Battery Charger
- Wide Operating Temperature: -20~60°C
- Low Profile, Low Power and Stylish Design

ARM9 | Nuvoton W90P910 | TLL | 1 COM | 2 USB | Wide Temp.

SPECIFICATION

Panel

LCD size	8", 4:3
Resolution	800 x 600
Pixel pitch	0.2025mm (H) x 0.2025mm (V)
Luminance	250nits (cd/m^2)
Contrast ratio	500
Viewing angle	60 (U), 70 (D), 70 (L), 70 (R)
Response time	40ms
Backlight	LED Backlight
Touch Type (Optional)	Resistive
Touch Light transmission	80%
Touch Interface	I^{2}C

System

Board	RSC-W910
CPU	Onboard Nuvoton W90P910 ARM9 200MHz SoC
System Chipset	Nuvoton W90P910CBN
System Memory	Onboard 64MB SDRAM (Up to 128MB)
SSD	Onboard 128MB NAND Flash (Storage, Up to 512MB)

Rear I/O

COM	1 x RS-232
Ethernet	1 x RJ-45
USB	2 x USB 2.0

Audio

AC97 Codec	Realtek ALC203

Ethernet

LAN Chip	On Chip MAC + PHY
Ethernet Interface	10/100 Base-Tx Fast Ethernet compatible

MECHANICAL & ENVIRONMENTAL

Panel

Colour	Front Silver & Rear Black
Mounting	Wall/Stand; VESA 75mm x 75mm
Power Input	12Vdc
Power Type	AT/ ATX
Operating Temp.	-20 ~ 60°C
Storage Temp.	-20 ~ 75°C
Operating Humidity	5% ~ 90% Relative Humidity, Non-condensing
Dimensions	202mm x 159mm x 43mm
Weight	1.07 kg

Description	Part Number
8” TFT Panel PC with Nuvoton W90P910CBN 200MHz	RPC-0801

8.9” WSVGA TFT Fanless Multifunctional Panel PC

FPC-08WA1

FEATURES

- 8.9” WSVGA TFT Touch Panel PC
- 5-wire Resistive Touch Screen
- FPC-08WA1: AMD Geode LX800/CS5536 Chipset
- FPC-08W04: Intel® 945GSE / ICH7-M Chipset
- VGA, Audio
- Dual Ethernet / Gigabit Ethernet, Optional WiFi Module
- 1 CF, 2 COM, 2 USB
- Fanless & +12V Single Power Input
- Wide Range Voltage Input +10V~+28V (FPC-08WA1)
- VESA Compliance
- IP-65 Compliant Front Panel

Intel®/ AMD | Touch Screen | 2 LAN | CF | 2 USB | Fanless | VESA | IP-65 | 2 COM

SPECIFICATION

Model Name	FPC-08WA1	FPC-08W04
LCD Size	8.9”	8.9”
Display Type	WSVGA TFT	WSVGA TFT
Resolution	1024 x 600	1024 x 600
Colour	256 K	256 K
Pixel Pitch	0.1905 mm(H) x 0.189 mm(V)	0.1905 mm(H) x 0.189 mm(V)
Luminance	220 cd/m2	220 cd/m2
Contrast Ratio	500	500
Viewing Angle	50 (U), 60 (D), 70 (L), 70 (R)	50 (U), 60 (D), 70 (L), 70 (R)
Response Time	30 ms	30 ms
Back Light	LED	LED
Touch Screen	5-wire Resistive	5-wire Resistive
Light Transmission	80%	80%
Touch Interface	USB onboard touch interface	USB
System		
CPU	Onboard AMD Geode LX800 @ 0.9 W 500 MHz with 128K L2 Cache CPU	Intel® Atom™ N270 1.6 GHz CPU
Cooling Method	Passive CPU heatsink	Passive CPU heatsink
System Chipset	AMD Geode LX800 / CS5536	Intel® 945GSE / ICH7-M
I/O Chip	Winbond W83627HG-AW	ITE IT8712F
System Memory	Onboard 512 MB DDR Memory	One 200-pin SODIMM socket supports up to 2 GB DDR2 400/533
SDRAM		
SSD	1 x CompactFlash Type I/II socket (internal)	1 x CompactFlash Type I/II socket (internal)
VGA	1 x DB-15	1 x DB-15
Audio	Line out, Mic in	Line out, Mic in
WiFi	Optional USB WiFi 802.11 b/g (occupy one USB port)	Optional USB WiFi 802.11 b/g
Rear I/O		
Serial Port	1 x RS-232, 1 x RS-232 or optional RS-422/485	1 x RS-232, 1 x RS-232 or optional RS-422/485
Ethernet	2 x RJ-45 (Realtek RTL8101L LAN)	2 x RJ-45 (Marvell 88E8053 Gigabit Ethernet)
USB	Port 2 x USB 2.0	4 x USB 2.0
Mouse & K/B	1 x PS/2 KB/MS	n/a

MECHANICAL & ENVIRONMENTAL

Panel

Colour	Front Silver & Rear Black
Mounting	Wall/Stand; VESA 75mm x 75mm
Power Input	+9 ~ 24Vdc Wide Voltage
Power Type	AT/ ATX
Operating Temp.	-20 ~ 60°C
Storage Temp.	-20 ~ 75°C
Operating Humidity	5% ~ 90% Relative Humidity, Non-condensing
Dimensions	202mm x 159mm x 43mm

MECHANICAL & ENVIRONMENTAL

Colour	Front Panel Black; Rear Body Black
Mounting	Wall Mount/Stand/VESA 75 x 75 mm
Power Input	100~250 Vdc/ 47~63 Hz
Power Output	+12 Vdc / 5 A (60W)
Operating Temperature	0~40°C / -10°C ~ 60°C (FPC-08WA1)
Storage Temperature	-10°C ~ 50°C / -20°C ~ 70°C (FPC-08WA1)
Relative Humidity	10 to 95% @ 40°C, non-condensing
Dimension (W x D x H)	225 mm x 139 mm x 38.9 mm
Weight	1.26 kg

Description	Part Number
8.9” WSVGA TFT Touch Panel PC with AMD Geode LX800, 5-wire resistive Touch Panel	FPC-08WA1
8.9” WSVGA TFT Touch Panel PC with Intel® 945GSE Chipset, 5-wire resistive Touch Panel	FPC-08W04
WIFI USB Module for FPC-08WA1 Series	ACC-WIFI-USB-8R
WIFI USB Module for FPC-08W04 Series	ACC-WIFI-USB-9R
VESA Stand/Wall 75/100 mm for 8” Panel PC, 165 x 140 x 20.5 mm	ACC-ARM-D15R
VESA Stand/Wall 75/100 mm for 8/10” Panel PC, 169 x 167 x 20.5 mm	ACC-ARM-D16R
Wall Mount Bracket Kit for FPC-08W	ACC-FPC-WALLMT-02R
VESA STAND, 75 mm	ACC-ARM-01R (Z Type)
CompactFlash Card Series (xx=Capacity, Capacity Option: 128, 256, 512 MB, 1, 2, 4, 8 GB)	ACC-CF-XX

10.4” Intel® Atom™ N270 Fanless Industrial Touch Panel PC

LPC-1003

Description	Part Number
10.4” Intel® Atom™ N270 Fanless Industrial Touch Panel PC	LPC-1003

FEATURES

- 10.4” Multifunctional Touch Panel PC
- Onboard Intel® Atom™ N270 1.6 GHz (2.5W) CPU
- Intel® 945GSE / ICH7-M Chipset
- Onboard 1 GB DDR2 and One 200-pin DDR2 SODIMM supports up to 2 GB DDR2 400/533 (1GB per bank) SDRAM
- Dual Gigabit Ethernet, supports Wake on LAN
- 1 Mini PCI, 1 CF, 1 COM, 2 USB
- Optional WiFi Module, 2.5" HDD
- Fanless & Single +12V Operation
- Super Anti-Abrasion (SAA) Touch
- IP-65 Compliant Front Panel

Fanless | 2 GbE | Mini PCI | Atom | IP65
CF | 2 USB | Touch Screen | Single +12V | Anti-Abrasion

12.1” Intel® Atom™ N270 Fanless Industrial Touch Panel PC

LPC-1203

Description	Part Number
12.1” Intel® Atom™ N270 Fanless Industrial Touch Panel PC	LPC-1203

FEATURES

- 12.1” Multifunctional Touch Panel PC
- Onboard Intel® Atom™ N270 1.6 GHz (2.5W) CPU
- Onboard 1 GB DDR2 and One 200-pin DDR2 SODIMM supports up to 2 GB DDR2 400/533 (1 GB per bank) SDRAM
- Dual Gigabit Ethernet, supports Wake on LAN
- 1 Mini PCI, 1 CF, 1 COM, 2 USB
- Optional WiFi Module, 2.5" HDD
- Fanless & Single +12V Operation
- Wide Range Temp.: -5~60°C
- IP-65 Compliant Front Panel

Fanless | 2 GbE | Mini PCI | IP65 | Atom
CF | 2 USB | Touch Screen | Single +12V

15" XGA Intel® Atom™ N270 Fanless Touch Panel PC

PPC-1503

Description	Part Number
15” XGA Intel® Atom™ N270 Fanless Industrial Touch Panel PC	PPC-1503

FEATURES

- 15” 5-wire Resistive XGA TFT
- Onboard Intel® Atom™ N270 1.6 GHz (2.5W) CPU
- Intel® 945GSE / ICH7-M Chipset
- One SODIMM up to 2 GB DDR2 SDRAM
- Dual Gigabit Ethernet
- Audio, Speakers
- 1 Mini PCI, 1 CF, 1 COM, 2 USB
- Supports 2.5" SATA HDD
- Fanless Operation, VESA Compliance
- Programmable Function Key

Fanless | 2 GbE | Audio | Mini PCI | Atom
CF | 2 USB | VESA | Intel 945GSE | 1 COM

17" TFT Fanless Multifunctional Touch Panel PC

MTP-1703

FEATURES

- Intel® Atom™ N270 1.6GHz CPU
- Intel® 945GSE / ICH-7M Chipset
- 1 SODIMM up to 2GB DDR2 SDRAM
- 4 USB, 1 DVI-A, and Mini-PCIe
- 1 LAN, 2W Amplifier, 2.5" SATA HDD
- Single +19V, Fanless Operation
- IP65 Compliant Front Panel
- Optional WiFi Module

Fanless | TFT | Atom | 4 USB | IP65 | Intel 945GSE

Description	Part Number
17" TFT Fanless Multifunctional Touch Panel PC	MTP-1703

21" W Fanless Digital Signage Computer

MPC-21W3

FEATURES

- Intel® Atom™ N270 1.6GHz CPU (2.5W)
- Dual Gigabit Ethernet, 5.1-CH Audio
- 1 Mini PCI, 1 CF, 1 COM, 2 USB
- Optional Touch screen, WiFi Module, 2.5" HDD
- Optional Mini PCIe
- Fanless System & VESA Compliance
- Single +12V Operation

Fanless | 2 GbE | 5.1-CH Audio | Mini PCI | VESA | 1 COM | Atom | CF | 2 USB | Touch Screen | Mini PCIe

Description	Part Number
21" W Fanless Digital Signage Computer	MPC-21W3

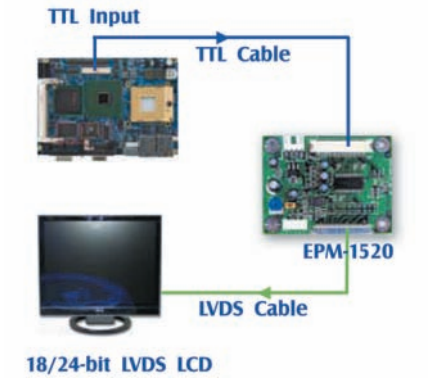
18/24-Bit LVDS Transmitter Module

EPM-1520

FEATURES

- Supports 20 to 85 MHz shift clock
- Up to 2.38 Gbps throughput
- Up to 297.5 Mbytes/sec bandwidth
- 345 mV (typ) swing LVDS devices for low EMI
- Compatible with TIA/EIA-644 LVDS standard
- Flat Panel/CRT interface:
  - NS DS90C385 or equivalent transmitter chipset (EPM-1520-24)
  - NS DS90C365 or equivalent transmitter chipset (EPM-1520-18)
  - Supports VGA, SVGA, XGA and single/dual pixel SXVGA display type
- 40-pin DFB-40DP-1.25V (Input)
- Operating temperature: 0 to 60°C
- Size (L x W): 65 mm x 50 mm (2.6" x 2.0")

DIAGRAM



SUPPORTING BOARDS

- Avalue boards with 18/24 bit TTL port

Description	Part Number
18-bit LVDS Transmitter Module	EPM-1520-18
18/24-bit LVDS Transmitter Module	EPM-1520-24

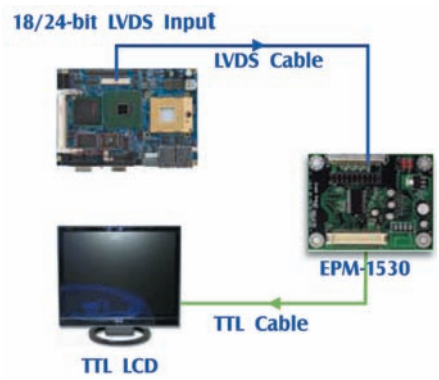
18/24-Bit LVDS Receiver Module

EPM-1530

FEATURES

- Supports 20 to 85 MHz shift clock
- Up to 2.38 Gbps throughput
- Up to 297.5 Mbytes/sec bandwidth
- 345mV (typ) swing LVDS devices for low EMI
- Compatible with TIA/EIA-644 LVDS standard
- Flat Panel/CRT interface:
  - NS DS90C384 or equivalent receiver chipset (EPM-1530-24)
  - NS DS90C364 or equivalent receiver chipset (EPM-1530-18)
  - Supports VGA, SVGA, XGA and single/dual pixel SXVGA display type
- 20-pin HIROSE DF14A-20P-1.25H Connector (Input)
- Operating temperature: 0 to 60°C
- Size (L x W): 65 mm x 50 mm (2.6" x 2.0")

DIAGRAM



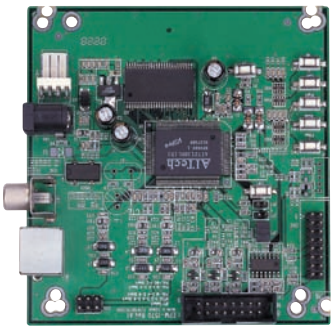
SUPPORTING BOARDS

- Avalue boards with 18/24 bit LVDS port

Description	Part Number
18-bit LVDS Receiver Module	EPM-1530-18
18/24-bit LVDS Receiver Module	EPM-1530-24

VGA to TV-out Module

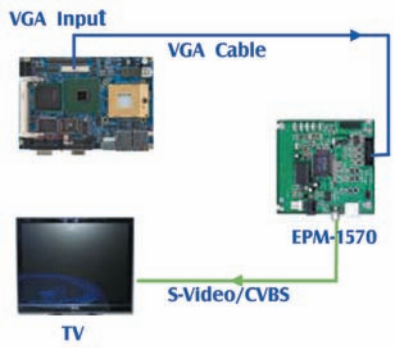
EPM-1570



FEATURES

- Simultaneous display on monitor, LCD and TV
- Multiple frequency input formats:
  640 x 480, up to 85Hz; 800 x 600, up to 85Hz; 1024 x 768, up to 70Hz
- Supports NTSC, NTSC-EIAJ, and PAL-B/D/G/H/I/M/N standards
- Flic-free filter
- Selectable TV-out format - Composite, S-Video
- Auto detect input video mode
- Auto detect the presence of the TV
- Single +5V power supply
- Size (L x W): 96 mm x 90 mm (3.8" x 3.5")

DIAGRAM



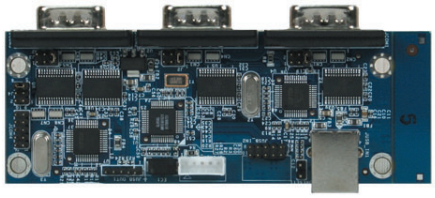
SUPPORTING BOARDS

- All Avalue boards

Description	Part Number
VGA to TV-out Module	EPM-1570

USB to Serial Port Module

EPM-1524

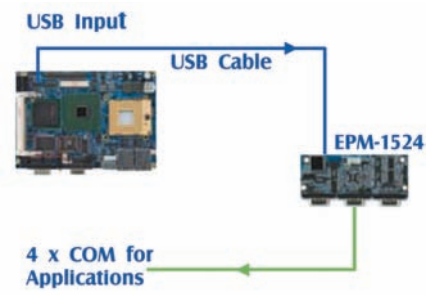


Bracket for EPM-1524

FEATURES

- Simultaneous display on monitor, LCD and TV
- Multiple frequency input formats:
  640 x 480, up to 85Hz; 800 x 600, up to 85Hz; 1024 x 768, up to 70Hz
- Supports NTSC, NTSC-EIAJ, and PAL-B/D/G/H/I/M/N standards
- Flic-free filter
- Selectable TV-out format - Composite, S-Video
- Auto detect input video mode
- Auto detect the presence of the TV
- Single +5V power supply
- Size (L x W): 96 mm x 90 mm (3.8" x 3.5")

DIAGRAM



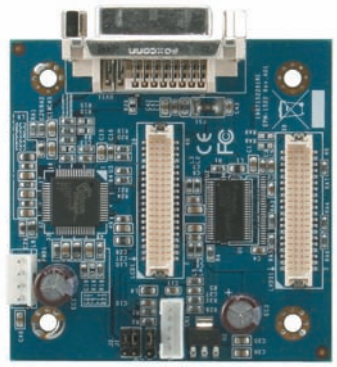
SUPPORTING BOARDS

- All Avalue boards

Description	Part Number
USB to Serial Port Module	EPM-1524
Bracket for EPM-1524	E1963152400R

18/24-Bit TTL/LVDS to DVI Transmitter

EPM-1522

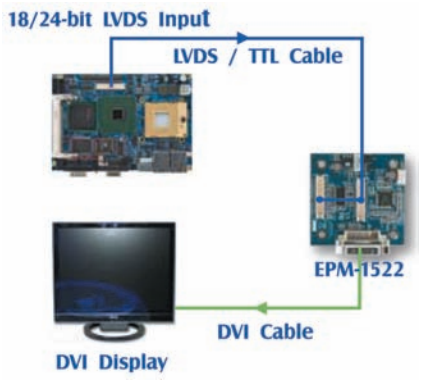


Bracket for EPM-1522

FEATURES

- Supports 18 and 24 bit LVDS to DVI
- Supports 18 bit /24 bit TTL LCD to DVI (Option)
- Standard DVI connector
- Single +5V power supply
- LCD Connector: Hirose DF13-40DP-1.25V x 2, one for LVDS input, one for TTL input
- Power input connector: Standard mini power connector, pitch 2.54mm (+5V, GND, GND, +12V), can be changed to vertical/ horizontal type of connector
- DVI Output: Standard DVI connector
- Operating temperature: 0 to 60°C
- Size (L x W): 66 mm x 66 mm (2.6" x 2.6"), 4 stand-off need compatible with uPGA 479 cooler stand-off

DIAGRAM



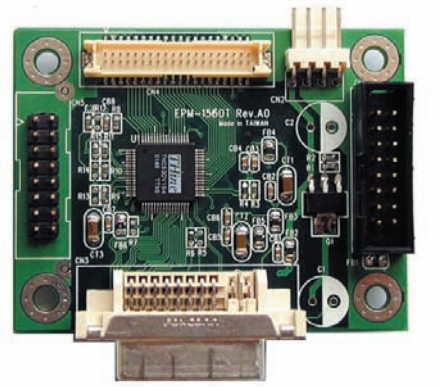
SUPPORTING BOARDS

- All Avalue boards

Description	Part Number
18-bit TTL/LVDS to DVI Transmitter	EPM-1522-18
24-bit TTL/LVDS to DVI Transmitter	EPM-1522-24
DVI Bracket for EPM-1522	E1963152200R

Panel-Link Transmitter Module

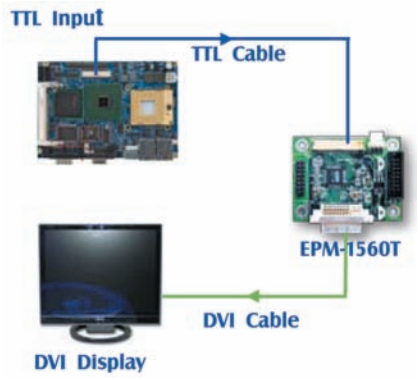
EPM-1560T



FEATURES

- Scalable Bandwidth: 25 - 165 megapixels/sec (VGA to UXGA)
- Flexible graphics controller interface: 24-bit (1 pixel/clock) mode inputs
- Flexible input clocking:
  - Single clock single edge
  - Single clock dual edge
- Low EMI low voltage interface: +3.3V with option for +1.0 to +1.8V
- Receiver detection: Supports hot plug detection
- Cable distance support: Over 5m with twisted pair and fibre-optics ready
- Standards compliant with DVI 1.0 (DVI is backwards compliant with VESA DTM and DFP)
- Size (L x W): 66 mm x 50 mm (2.6" x 2")

DIAGRAM



SUPPORTING BOARDS

- Avalue boards with 24-bit TTL LCD port

Description	Part Number
Panel-Link Transmitter Module	EPM-1560T

VGA/DVI to TTL/LVDS Scaler Module

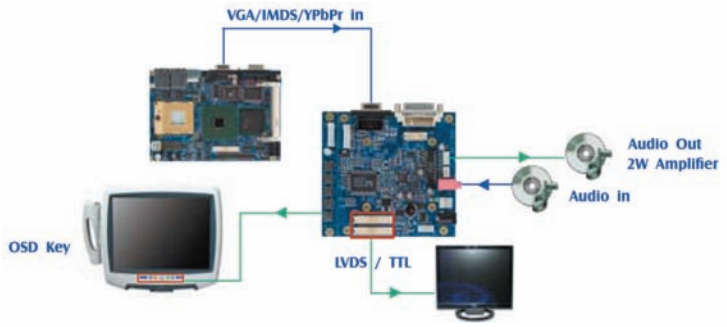
EPM-1525

FEATURES

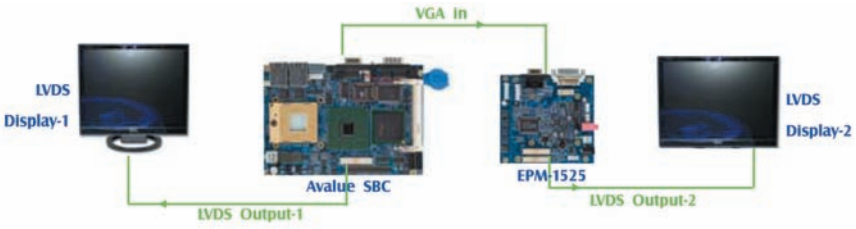
- Supports single channel 18/24-bit TTL and dual channel 18/24-bit LVDS
- Supports VGA/TMDS/YPcPr input to LVDS SXGA/UXGA/ WSXGA+/WXGA+ resolution
- Fully programmable zoom ratios
- Supports non-linear scaling from 4:3 to 16:9 or 16:9 to 4:3
- Zoom scaling up and down
- Supports power save mode when no signal input
- Programmable 5 keys OSD
- 2 W amplify audio output
- +12V Only Operation

Note: Adjust firmware for specific LCD is necessary, please contact in advance
Note: Please link to www.avalue.com.tw for supported panels information
Note: Max current output: 5V@5A, 3.3V@5A

DIAGRAM



MULTI-LVDS DISPLAY



Both horizontal (16:9) and vertical (9:16) displays are available, as long as via various hardware settings.

RESOLUTION TABLE

Resolution	Description	Pixels
VGA	Video Graphics Array	640 x 480
XGA	Extended Graphics Array	1024 x 768
SXGA	Super Extended Graphics	1280 x 1024
UXGA	Ultra Extended Graphics	1600 x 1200
WXGA	Wide Extended Graphics	1366 x 768
WSXGA	Wide Super Extended Graphics	1680 x 1050
WUXGA	Wide Ultra Extended Graphics	1920 x 1200

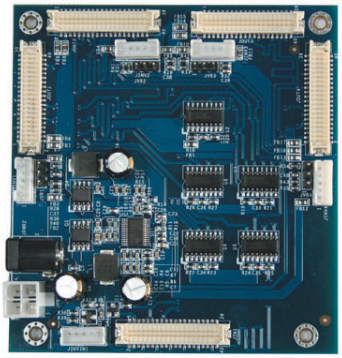
SUPPORTING BOARDS

- All Avalue boards

Description	Part Number
VGA/DVI to 18/24 TTL/LVDS Scaler Module	EPM-1525
YPbPr Signal Input Cable	E170X100180R

1 LVDS to 4 LVDS Module

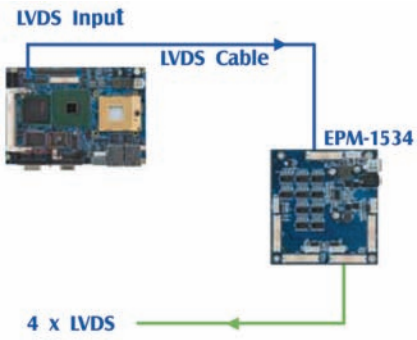
EPM-1534



FEATURES

- Supports dual channel 18/24-bit LVDS signal
- +12V power input from power jack or ATX 4-pin power connector
- PC/104 Form Factor
- 1xLVDS in, 4xLVDS out (dual channel support)
- Operating temperature: 32 to 140°F (0 to 60°C)
- Size (L x W): 96 mm x 90 mm x 10 mm
  Note: Max current output: 5V@8A, 3.3V @7A

DIAGRAM



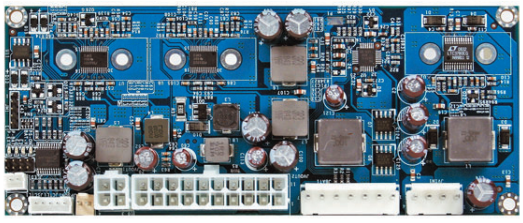
SUPPORTING BOARDS

- All Avalue boards

Description	Part Number
Single LVDS to 4 LVDS Module	EPM-1534

Smart Battery Module

EPM-1710



FEATURES

- I/O Interface: RS-232
- AT/ATX Mode
- Load Down Protection
- Over Voltage Protection
- Short Circuit Protection
- Over Current Protection
- Smart Battery Charger for Li-ion
- SPEC: Input Voltage: 6VDC ~36 VDC, Battery Charge Voltage: 16.8V, Efficiency: up to 90%
- Size (L x W x H): 60mm x 100mm x 20mm

BATTERY SPEC

Cell Configure	4S1P	4S2P
Charge Voltage	16.8V	
Cell Type	Li-ion	
Max. Power	35W	70W
Max. Discharge Current	4A	8A
Capacity	2200mAh	4400mAh
Full Charge Time	2 hours	
Operation Temperature	0°C to 45°C	
Storage Temperature	-20°C to 60°C	

Description	Part Number
Smart Battery Module Li-ion Battery, 4S1P, 2200mAh Li-ion Battery, 4S2P, 4400mAh	EPM-1710 ACC-BAT-4S1P ACC-BAT-4S2P

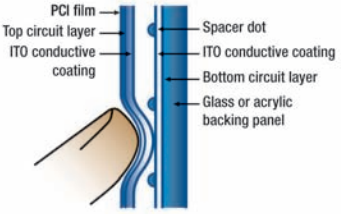
S-Touch™ Resistive Touch Screen Controller

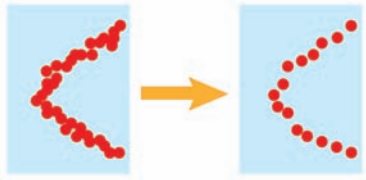
Introduction

The S-Touch touchscreen controller is a four-wire resistive controller featuring autonomous functionality to minimise demands on the host processor. For embedded designers, this frees valuable CPU cycles to ease pressure on performance, power consumption and response times.

FEATURES

- IQQ2C (400kHz) or SPI (1MHz) serial interface
- 12-bit ADC for high-resolution touchscreen
- 128-depth data buffering
- Advanced movement tracking to reduce CPU/bus use
- Window masking function allows intelligent use of screen
- 4 kV HBM ESD protection
- Ultra-low power consumption (active <1mA, idle <1µA)
- Ultra-small (3.0 x 3.0mm) QFN16 package



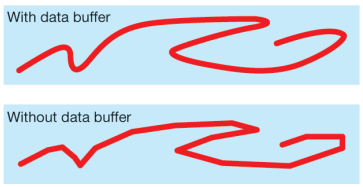


Advanced Movement tracking

The host may set a value from 4 to 127 as the distance between the new touch position and the previous position so it may be considered as the valid new position. This reduces redundant, nearby data positions.

Window Masking

The host may define a rectangle within the full window so that if the touch position falls outside of the defined window, the touch is simply ignored.



Data Buffer (FIFO)

128 sets of data buffers in the touchscreen controller ensure that no data is missing, even if the CPU is busy. Each data buffer contains a 12-bit x-coordinate, a 12-bit y-coordinate and an 8-bit touch pressure interrupt on FIFO full, FIFO empty and FIFO reaching programmable threshold.

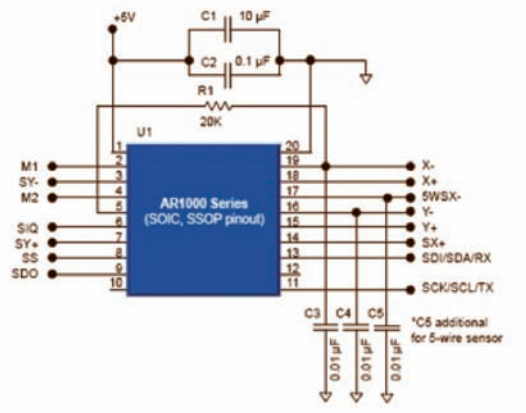
S-Touch™ Resistive Touch Screen Controller

GPIOs	Vcc	Touchscreen Technology	Interface	Part Number
8	1.8 to 3.3 V	4-wire resistive	SPI/I2C	STMPE811
6	1.8 to 3.3 V	4-wire resistive	SPI/I2C	STMPE610

mTouch™ AR1000 Series Resistive Touch Screen Controller

Introduction

The mTouch™ AR1000 Series Resistive Touch Screen Controller is a complete, easy to integrate, cost effective and universal touch screen controller chip solution.



FEATURES

- Turnkey Touch Solution
- Built in Decoding and Advanced Filtering
- Controller Driven Calibration
- Low Cost with Few External Components
- Universal 4, 5 and 8-wire Support
- Fast Time to Market
- Small Footprint
- Low Power
- SPI, I2C™, UART Support
- Developed by Touch Experts

AR1000 Development Kits

ORDER YOUR DEVELOPMENT KITS NOW

The AR1000 Series is designed for high volume, small form factor touch solutions with quick time to market requirements.

The mTouch AR1000 Development Kit provides everything designers need to get started using AR1000 resistive controllers for a turn-key, cost effective solution. The kit includes the AR1000 development board, a 7" four-wire resistive touch screen, a PICkit™ Serial Analyser and all necessary interface cables, as well as a CD containing technical documentation and all necessary software. The CD also includes an easy-to-use AR1000 configuration utility, which has a Graphical User Interface (GUI) that enables designers to test all user-configurable options with the AR1000 controllers.

Description	Part Number
mTouch AR1000 Development Kit	DV102011

SSD2521 Capacitive Touch Screen Controller

SOLOMON SYSTECH

Introduction

Unlike resistive, the capacitive touch panel requires a controller to compute and transform the touch signal to a simple data format for the system. To fulfil the market needs. Solomon Systech presents SSD2521, a Capacitive Touch Panel Controller with multi-touch support.

SSD2521 is an all-in-one capacitive touch panel controller that integrates the power circuits, panel driving and sensing circuits, high resolution ADC, signal processor and finger tracking unit into a single chip. It can drive capacitive touch panel with channel numbers up to 21 driving and 12 sensing.

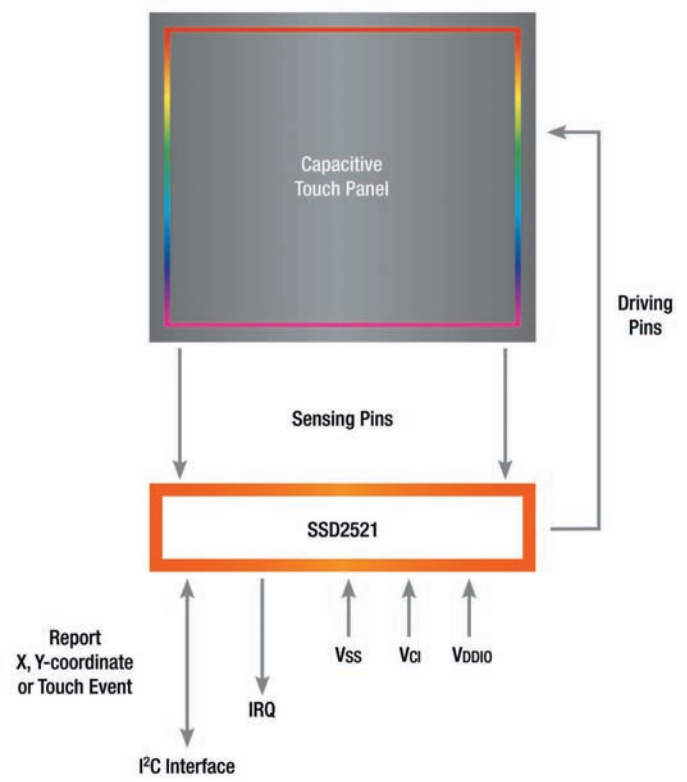
SSD2521 has implemented several arithmetic algorithms for finger extraction and tracking. It can track up to a maximum 4 fingers concurrently and report to user the absolute coordinate of each finger. In addition, it can detect incidents and events based on the tracked finger coordinates.

FEATURES

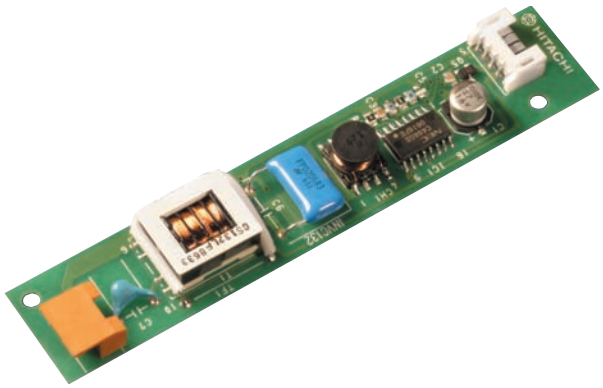
- High Voltage Driving Signal for better sensing performance
- On-Chip DC-DC Converter
- 21 Driving and 12 Sensing Pins support touch panel with 33 Channels max.
- Support 640 x 352 Touch Resolution and capable of supporting up to WVGA Panel
- Support 200Hz[1] max. Scan Rate
- Support Multi Touch Application with Max. 4 points
- Support 5 Types Touch Event Report
- Support Automatic Scan Rate Control for Power Saving
- Support Auto Calibration
- Embedded Noise Rejection Correlator for better SNR
- Support I²C with Data Rate up to 400Kbits
- Package : 68/48 Pins QFN

[1] For application with less than 15 driving channels

APPLICATION DIAGRAM



Description	Part Number
Capacitive Touch Screen Controller	SSD2521



HITACHI
Inspire the Next

CCFL Inverters

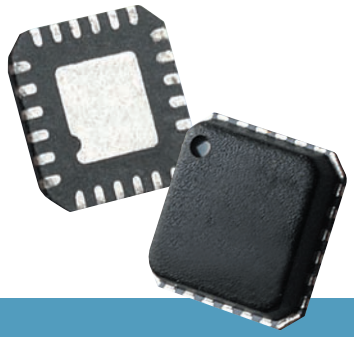
Introduction

A range of inverters specifically designed to drive the CCFL backlights of Hitachi displays listed in this brochure.

FEATURES

- Low Voltage, 5V & 12V
- Single, Dual & Quad Output
- Dimming Facility Available
- Remote On/Off Function

Part Number	Description	Input Voltage	Input Voltage Range	Input Current (mA)	Dimensions (mm) L x W x H	Features
INVC132	For SP14Q002, SP14Q003 & SP14Q005	12V	8.0 - 17V	200	103.0 x 20.0 x 10.0	Dim Function
INVC186	For SP14Q002, SP14Q003 & SP14Q005	12V	10.8 -13.2V	170	90.0 x 20.0 x 8.4	–
INVC196	For SP14Q002, SP14Q003 & SP14Q005	5V	4.5 - 5.5V	360	90.0 x 20.0 x 8.4	–
INVC617	For TX14D11, TX18D16 & TX20D16	12V	10.8 - 13.2V	500	100.0 x 30.0 x 11.5	Dim Function
INVC655	For TX26D55 (2 Outputs)	12V	9.6 - 14.4V	580	140.0 x 22.0 x 8.0	Dim Function
INVC657	For TX14D11, TX18D16 & TX20D16	12V	10.8 - 13.2V	320	120.0 x 12.0 x 6.0	Dim Function
INVC659	For TX16D11	12V	9.0 - 13.2V	220	80.0 x 16.0 x 6.3	Dim Function
INVC667	For SX14Q004	5V	4.5 - 5.5V	480	90.5 x 22.0 x 10.0	–
INVC783	For TX31D56 & TX31D58 (2 Outputs)	12V	10.8 - 13.2V	960	130.0 x 35.0 x 10.0	Dim Function
INVC784	For TX38D55, TX39D55 & TX43D55 (4 Outputs)	12V	10.8 - 13.2V	1300	180.0 x 35.0 x 10.0	Dim Function
INVC789	For TX18D57	12V	10.8 - 13.2V	680	100.0 x 30.0 x 6.0	Dim Function
INVC813	For TX43D57	12V	10.8 - 13.2V	1570	198.0 x 40.0 x 10.0	Dim Function
INVC814	For TX23D12 & TX23D55	12V	10.8 - 13.2V	570	100.0 x 30.0 x 10.0	Dim Function
INVC817	For SP24V001	12V	8.0 - 17.0V	210	130.0 x 18.0 x 6.0	Dim Function
INVC818	For LMG7520, LMG7525 & LMG7550	12V	7.0 - 19.0V	350	110.0 x 13.0 x 8.0	Dim Function
INVC823	For SP24V001	12V	8.0 - 17.0V	260	130.0 x 18.0 x 8.0	Dim Function
INVC828	For SP12N002, SP14N001, SP14N002, SP14N003 & LMG7420	12V	7.0 - 17.0V	180	95.0 x 15.0 x 8.0	Dim Function
INVC829	For TX14D12	5V	4.75 - 5.25V	590	80.0 x 16.0 x 6.2	Dim Function



White LED Drivers

Introduction

A range of white LED drivers ideal for driving LED based LCD backlights helping to give unprecedented clarity to the image and long term reliability to the backlight. Integrated into a single chip to free up valuable board space the range of LED drivers incorporate features such as brightness adjustment, protection circuits and high performance constant current drivers.

Part Number	Min & Max Input Voltage (V)	Output Voltage (V)	Frequency (kHz) typ.	Efficieny (%)	Quiescent Current (mA) typ.	Standby Quiescent Current (μA) typ.	Package Outline
AP3154A	2.7 - 5.5	-	0.6/ 1.2/ 1.8	88	1.2	1	DFN3030-12
AP3156	2.7 - 5.5	-	0.5/ 1.0/ 2.0	88	1.5	1	QFN4040-16
AP5724	2.7 - 5.5	26	1.4	84	2	1	DFN2020C-6 SOT26
AP5725	2.7 - 5.5	26	1.4	84	2	1	DFN2020C-6 SOT26
AP5726	2.7 - 5.5	26	1.4	84	2	1	DFN2020C-6 SOT26
ZXLD1100	2.5 - 5.5	ADJ 28V Max	1000	80	0.06	0.5	SC70-6
ZXLD1101	2.5 - 5.5	ADJ 28V Max	1000	80	0.06	0.5	TSOT23-5
ZXLD1937	2.5 - 5.5	ADJ 28V Max	1000	80	0.06	0.5	TSOT23-5

Part Number	Description	Application	Vin (V)	Vout (V)	Irows (mA)	Number of rows	Min dimming time	Max LEDs per row
PM6600	Boost converters driving 6 rows of LEDs	Notebook LCD panel backlight	4.5 to 28	up to 36	30	6	500 ns	10 (white)
LED7706		LCD panel backlight	4.5 to 36	up to 36	30	6	500 ns	10
LED7707			4.5 to 36	up to 36	85	6	10 μs	10 (white)

See opposite page for ST Development Boards >

ST Development Boards

PM6600 Development Board

Part Number	Board	Description
STEVAL-ISA056V1		6-row, 30 mA LED driver with boost converter for notebook PC LCD-panel backlighting

LED770x Development Board

Part Number	Board	Description	Technical Documents
STEVAL-ILL020V1		LCD panel backlight demoboard based on LED7706 (6-row - 30 mA LED driver with boost converter)	AN2809: 6-row, 30 mA LED driver with boost converter for the backlight of LCD panels
STEVAL-ILL021V1		LCD panel backlight demoboard based on LED7707 (6-row - 85 mA LED driver with boost converter)	AN2810: 6-row 85 mA LED driver with boost converter for LCD panel backlighting

ST8R00 Development Board

Part Number	Board	Description	Technical Documents
STEVAL-ISA48V2		1A/adjustable Vout PWM synchronous step-up DC-DC converter based on ST8R00	AN2627: ST8R00 synchronous boost converter with output current cut-off function

intersil

Part Number	Description	Topologies	No. of LEDs (max.)	No. of Channels	Backlight for LCD Size	for DC/DC Lighting (mA)	I_{OUT} (max/channel) (mA)	V_{IN} (V)	V_{OUT} (max.) (V)	Frequency (MHz)	Brightness Control	Package
EL7630	6 LEDs Driver	Inductor Boost	6	1	1.8 to 3.5	–	30	2.7 to 5.5	27	1.35	PWM	5 Lead TSOT 6 Lead SC70
ISL78100	High Power LED Driver	3 to 8 High-Power in Series, Up to 32V	8	1	3.5 to 9.0	–	1000	2.7 to 16.0	32	1	DC or PWM	20 Lead QFN
ISL97631	6 LEDs, Driver with Integrated	Inductor Boost	7	1	1.8 to 3.5	–	30	2.7 to 5.5	27	1.35	PWM	6 Lead TSOT
ISL97632	White LED Driver with Digital Dimming	Inductor Boost	7	1	1.8 to 3.5	–	40	2.4 to 5.5	27	1.4	Digital 5-Bit Dimming	8 Lead TDFN (Eval board available, please contact us)
ISL97634	White LED Driver with PWM Dimming	Inductor Boost	7	1	1.8 to 3.5	–	40	2.4 to 5.5	27	1.4	PWM up to 20kHz	8 Lead TDFN
ISL97635	SMBus 8-Channel LED Driver	Inductor Boost	72	8	Up to 17.0	280	35	6 to 24.0	34.5	0.6/1.2	SMBus, PWM or DC	24 Lead QFN
ISL97635A	SMBus 6-Channel LED Driver	Inductor Boost	60	6	Up to 17.0	210	35	6 to 24.0	34.5	0.6/1.2	SMBus, PWM or DC	24 Lead QFN
ISL97636	8-Channel LED Driver	Inductor Boost	80	8	Up to 17.0	280	35	6 to 24.0	34.5	1.2	PWM	24 Lead QFN
ISL97636A	8-Channel LED Driver	Inductor Boost	60	6	Up to 17.0	210	35	6 to 24.0	34.5	1.2	PWM	24 Lead QFN
ISL97677	SMBus/I2C 8-Channel LED Driver	Inductor Boost	96	8	Up to 17.0	400	50	4.75 to 26.0	45	1.5	PWM	32 Lead QFN
ISL97678	8-Channel 45V 50mA LED Driver	Inductor Boost	96	8	Up to 17.0	400	50	4.75 to 26.0	45	1.5	PWM	32 Lead QFN

Membrane/ Rubber Keypads

Custom Design Keypads

Features

Membrane Keypads

- Graphic overlay only or full switching membrane
- Metal or polydome contacts
- Tactile or non-tactile feel
- Integral SMD LEDs
- LCD windows
- ESD/RFI shielding
- Insertable legend options

Rubber Keypads

- Backlighting options
- Various coatings e.g. epoxy, polyurethane
- Various travel/operating force options
- Combination with tactile switches
- Wide variation of colours and designs
- Plastic key tops available

Introduction

Membrane Keypads

Membrane keypads offer a unique combination of features to enable fast and simple supply of customer specific keypads.

Designed to your requirements, the high quality products include switches that are available in flat, poly-domed and metal domed types, giving a variety of levels of tactile feedback and long life expectancy.

All membrane keypad designs are tested for resistance to surface scratching, thermal shock, electrical ratings and operating lifetime.

Silicone Rubber Keypads

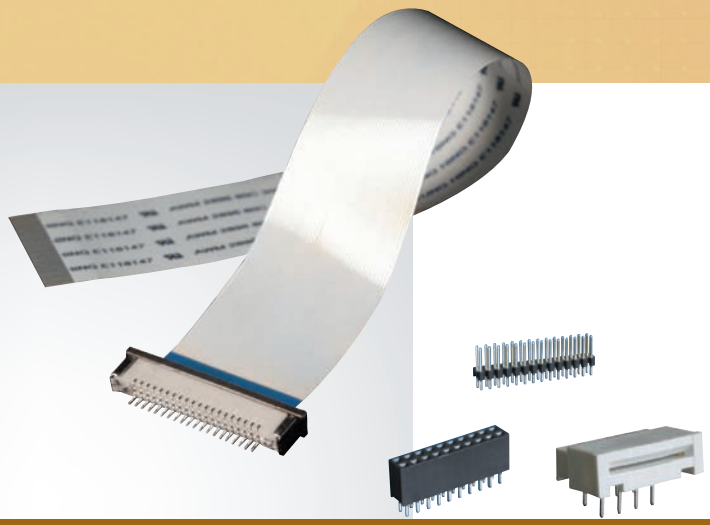
Silicone rubber keypads are manufactured from elastic, non-toxic silicone rubber compounds and are processed from compression or injection moulding. The result is an economic and reliable keypad for small, medium and large production runs.

Silicone keypads can be integrated with printed circuit boards or flexible circuits and have excellent resistance to temperature and ageing.

Examples of various keypads.

Need to know more

Then contact our experienced technical team. Phone them on +44 (0)1945 47 46 45 or email info@anglia-displays.com. Alternatively, visit us at www.anglia-displays.com



To Match The Displays

Features

- Data Cable & Connectors
- Backlight Connectors
- Inverter Connectors
- Touchscreen Connectors

Introduction

Although the connection requirements for displays featured in this brochure are many and varied, we have access to a wide portfolio of matching connectors from Hirose, Taicom and AVX, plus data cable, to help you complete your project.

Our website provides all the necessary information by giving each display a reference code or group of reference codes in their appropriate table listing. Clicking on these codes immediately identifies which cables and connectors are required to match the chosen display together with their part numbers for ordering.

Data cable and connectors

Flat Flexible Cable and FFC connectors, pin headers and sockets.

Backlight connectors

Pin headers to accept flying lead socket from the displays.

Inverter connectors

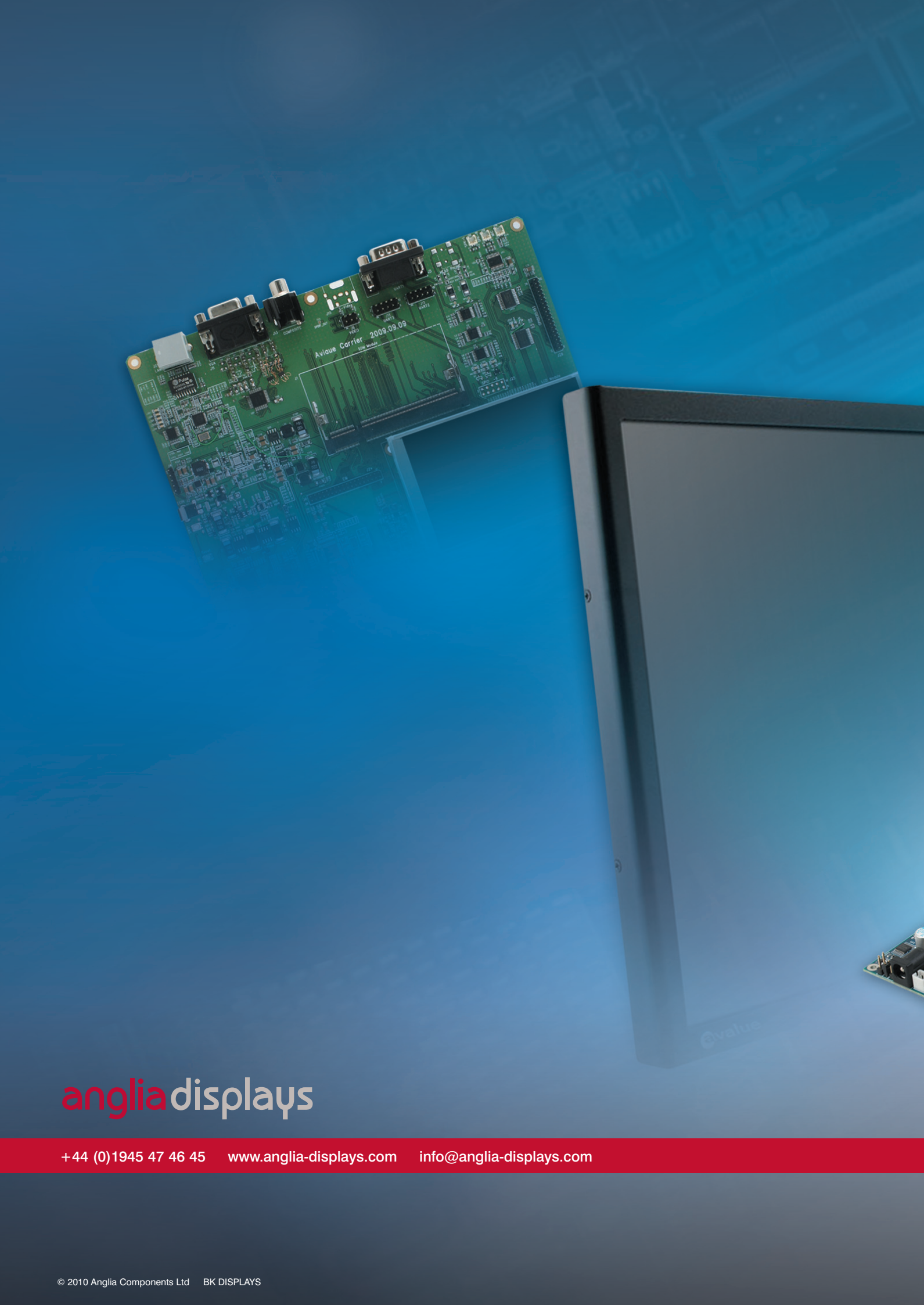
Crimp sockets for DC input on CCFL inverters.

Touchscreen connectors

4 way FFC connectors for your touchscreen controller PCB.

Visit our website to access the cable and connector information relevant to your chosen display:

www.anglia-displays.com



+44 (0)1945 47 46 45 www.anglia-displays.com info@anglia-displays.com

© 2010 Anglia Components Ltd BK DISPLAYS